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ELEMENTS OF MEDICINE.

ELEMENTS OF MEDICINE:

A COMPENDIOUS VIEW OF

PATHOLOGY AND THERAPEUTICS;

OR THE

HISTORY AND TREATMENT OF DISEASES.

BY

SAMUEL HENRY DICKSON, M.D., LL.D.,
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STATE OF SOUTH CAROLINA, AND OF
THE THEORY AND PRACTICE OF MEDICINE IN THE NEW YORK UNIVERSITY.

SECOND EDITION, REVISED.

PHILADELPHIA:
BLANCHARD AND LEA.
1859.

D

Entered according to the Act of Congress, in the year 1855, by
BLANCHARD AND LEA,
in the Office of the Clerk of the District Court of the United States in and for the Eastern District of Pennsylvania.

PHILADELPHIA:
COLLINS, PRINTER, 705 JAYNE ST.

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TO

TEACHERS AND STUDENTS OF MEDICINE

THROUGHOUT

THE UNITED STATES,

This Volume

IS MOST RESPECTFULLY INSCRIBED

BY

THEIR FELLOW STUDENT AND COLLEAGUE,

SAMUEL HENRY DICKSON.

20245

PREFACE TO THE SECOND EDITION.

IN preparing for the press a second edition of my "Elements of Medicine," I have gladly availed myself of the notices of the work contained in the journals at the time of its appearance. I take this occasion to acknowledge, with much gratification, their almost uniformly courteous tenor. I have endeavored to supply the defects pointed out, to remove redundancies indicated, and to correct such errors as were commented on by my friendly critics, or discovered on my own part after the most careful revision.

The faithful and conscientious performance of that labor has made me, perhaps, even more profoundly sensible of the many imperfections of the work. Yet, in the belief that it has been found useful to those for whom it was written, and that it gives them some desirable aid in the prosecution of their toilsome studies, I again offer the volume to the indulgent consideration of my professional brethren.

S. HENRY DICKSON.

PHILADELPHIA, *May*, 1859.

PREFACE TO THE FIRST EDITION.

A BOOK should be judged and appreciated with some direct reference to its declared purpose. The present volume is intended as an aid to young men who have engaged in the study of medicine, to physicians who have recently assumed the responsibilities of practice, and to my fellow-professors of the institutes of medicine, and private instructors, who have felt the difficulty of communicating to the first two classes the knowledge which they are earnestly seeking to acquire.

Having been a teacher of medicine for thirty years, and a student more than forty, I must have accumulated some experience in both characters. I have prepared and printed for those in attendance on my lectures, many successive manuals or text-books; I have also written and published numerous treatises upon medical subjects in general. The first I have endeavored to improve, edition after edition, to render them more available and useful to those in whose hands they were placed. Of the latter, some of which have been favorably received, I have endeavored to learn and avoid the defects, to the best of my ability. The following pages are the result of a careful collation of what has been esteemed most valuable in both, with such matter as continued study and enlarged experience have enabled me to add. May I hope that they will not be altogether unworthy the approbation of my professional brethren!

It was necessary that the book should be as compendious as possible, or it would not have been acceptable to the student, upon whose time there are so many claims; it was also necessary that it should be written in the simplest and plainest style, that it might not be unadapted to the wants of those whose preliminary education has been hurried and imperfect: yet it was absolutely necessary that nothing essential to a fair development of the whole subject attempted should be left out.

While a judicious selection of topics was therefore demanded, a critical rejection of such details as might properly be omitted, was as imperatively required. A full statement of elementary principles was called for on the one hand, and all attainable brevity of discussion was equally indispensable on the other.

In the execution of a task so delicate as this, I cannot hope to have attained complete success. I shall be judged most kindly and indulgently, I am sure, by those best qualified to appreciate the actual difficulties encountered.

CHARLESTON, *August*, 1855.

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Cholera Asphyxia—a comparatively new disease of Eastern origin, extensive spread, and pestilential mortality; exotic, but threatening to become naturalized among us; characterized by profuse exosmose of serum into the stomach and bowels; universal spasm and cramps; intense capillary paralysis; profound collapse, preceded very generally by cholerine, a painless diarrhœa; history, symptoms, and lesions detailed; treatment unsatisfactory . 510—522

Diarrhœa—a neuropathic affection of the small intestines, manifested by undue peristaltic action, with abundant fluid discharges; its character varies with the cause; relieved by astringents and anodynes when simple; occasionally assumes a chronic tenacity almost indomitable . . . . . 522—528

Dysentery—seated in the larger bowels; pyrectic, inflammatory, and hemorrhagic, with painful constriction and spasmodic action, and often ulceration; often epidemic; sometimes probably contagious; modified by climate, and season, and locality; history; autopsy; various treatment: in its chronic form most obstinate and unmanageable . . . . 529—544

Cholera Infantum—regarded by several American writers as a specific disease; the name includes all the "bowel complaints" of children of tender age, and especially under dentition; modified treatment necessary; general management of such cases; benefit of country air . . . . . . 544—552

Helminthia—Intestinal worms—occasion disease doubtless by increase of numbers, especially in young subjects not very robust; Tænia—the tormentor of adult life—better controlled now than formerly . . . . . 552—560

DISEASES OF THE COLLATITIOUS VISCERA.

Of the Liver—Hepatitis—acute and chronic, with their effects; enlargement, induration, abscess; Hypertrophy; atrophy; Cirrhosis—hobnail or nutmeg liver; fatty degeneration . . . . 560—570

Icterus—Jaundice—causes and nature differ much; mere torpor; inspissation of bile; obstruction of duct by thickening, by spasm, and by gallstones or biliary calculi of diversified character and composition; surface and tissues discolored generally yellow; a black and green jaundice recognized 570—581

Of the Spleen—Splenitis—may supervene upon malarial enlargement of the organ, or arise spontaneously; affections of this organ are apt to be tenacious 582—584

Of the Parotid—Mumps—Parotitis—a contagious specific malady; attacks but once; inflammation metastatic, or extending to testis and mamma, and, rarely, to the brain . . . . 584—587

Of the Pharynx—Sore-throat—this inflammation assumes a most diversified character—simple, superficial, ulcerative, and phlegmonous—quinsy; diphtherite; angina maligna . . . . 588—592

SECTION III.

DISEASES OF THE RESPIRATORY SYSTEM.

Exploration of the thorax in various modes enjoined; by auscultation, mediate and immediate; by percussion, with and without the pleximeter; by palpation; mensuration, &c.; the vocal and respiratory sounds, normal and morbid, enumerated and commented on . . . . . . 593—599

DISEASES OF THE AIR-PASSAGES.

Croup—acute laryngo-tracheitis; affects children often, adults rarely; inflammatory, pyrectic, catarrhal, membranous, with pseudo-plasma exudation; history, prognosis, and various methods of treatment . . . . 599—606

Laryngitis, Chronic—Laryngeal Phthisis—a follicular inflammation and ulceration of larynx and fauces, with aphonia and dysphagia when intense; autopsy shows œdema, destructive ulceration, and caries; almost always of tubercular character, and terminates in that form of consumption . . 606—607

Laryngismus Stridulus—a spasmodic affection of the glottis, arising from a specific irritability of the part and of the larynx; neuropathic, and associated often with tendency to general spasm and convulsion . . . 607—608

Bronchitis, Acute—associated with many maladies, catarrhal fever, pneumonia, pertussis, and asthma; in the old and infirm, the inflamed membrane pours out vast effusion of mucus, threatening suffocation—peripneumonia notha. Chronic—recognized as a form of phthisis—catarrhal consumption; when long protracted, is attended with hectic, emaciation, and diarrhœa . . 608—611

DISEASES OF THE LUNGS AND INVESTING MEMBRANE.

Pleuritis—a very common malady, produced by cold; results in adhesions, and serous or purulent effusion; modified in malarious regions, "bilious pleurisy;" physical signs described; rational symptoms; paracentesis . . 611—613

Pneumonia, Acute—described; splenization, hepatization, carnification, and infiltration; gangrene of lung; physical signs; loss of resonance, crepitant râle, and mucous râle; the medicine expectante extolled here by many; active management advised, with proper attention to contingencies; bilious pneumonia . . . . 613—621

Chronic Pneumonia—Apostematous Phthisis; pulmonary abscess not very unfrequently met with; may result from wounds, or follow an acute attack 621—623

Phthisis, Tubercular—with deposit of tuberculous matter in the lung; the apex its chief seat; variety of forms; insidious invasion of the disease; early symptoms; prolonged expiration; physical signs at first almost negative; improved hopefulness of cure; oils—cod-liver, neat's-foot, cocoa-nut; Green's catheterism of lung; iodine, and other inhalations . . . . . . 624—637

Asthma—a neuropathic affection; purely spasmodic in *dry* nervous asthma; rigidity of bronchial fibre; mingled, in *humoral* asthma, with large mucous effusion; often combined with bronchitis and other maladies; gives rise to emphysema; hereditary, tenacious, recurrent, sometimes periodical . . . 637—646

Pertussis—a complicated disease of the respiratory organs; pyrectic, convulsive, perhaps of eruptive character; contagious; epidemic; occurs but once in the subject; duration uncertain; treatment unsatisfactory . . 647—655

SECTION IV.

DISEASES OF THE SENSORIAL SYSTEM.

DISORDERS CHIEFLY AFFECTING THE BRAIN.

Cephalalgia—Headache—sick, nervous, irritative, congestive; a tenacious and indomitable malady, constitutional, habitual, recurrent, often hereditary; treatment palliative and prophylactic . . . . . 656—658

PHRENITIS, Acute and Chronic—the former not frequent as idiopathic; requires active treatment; promptly results in destructive organic change; the latter, the source of many of the forms of *Insanity;* these not easily managed domestically; patients are best in our excellent asylums . . . . 658—662

MANIA-A-POTU—Delirium Tremens—alcoholic poisoning; its history and pathology disputed; considered by some a cerebral anæmia; a complex malady; the sensorial disorder being modified by the varied visceral derangements; treatment; prophylaxis . . . . 663—666

APOPLEXY—the result of pressure upon the brain, intravascular, or by hemorrhage, extravascular; determination to the head by stooping, or heat, insolation; violent passion; predisposition; "apoplectic form;" treatment; prophylaxis . . . . 667—669

PARALYSIS—impairment of sensitiveness and motivity, and voluntary motion; partial and general; simple and complex . . . . . 669—670

HEMIPLEGIA—for the most part the result of a cerebral hemorrhage, producing paralysis of the opposite side of the body; the lower limb more frequently restored than the upper . . . . 670—673

SPINAL DISORDERS.

PARAPLEGIA—palsy of the lower half of the body; often the result of obvious lesion of the spine; sometimes it is said to be of cerebral source; cases occur without any lesion of either, unaccounted for; prognosis unfavorable; treatment unsatisfactory . . . . 673—674

CHOREA SANCTI VITI—Paralysis Vacillans—attacks children chiefly, adults rarely; connected often with rheumatism; seat and nature disputed; treatment various; by tonics, baths, and gymnastic exercises . . . . 674—678

EPILEPSY—falling sickness; "grand et petit mal;" catalepsy; Marshall Hall's views relative to congestion of brain and laryngeal spasm; Todd's suggested humoral theory of accumulation of urea in the blood; palliative tracheotomy; specific remedies; rational treatment; aura; prophylaxis . . 678—692

NERVOUS DISORDERS.

TETANUS—probably seated primarily in the spine, soon involves the whole sensorial system; centric and peripheral; idiopathic and secondary, toxic and traumatic; pathology ill understood; prognosis unfavorable; treatment unsatisfactory 692—698

MYELITIS, Spinitis, Spinal Meningitis: acute or chronic; both rare; their causes not clearly known; their lesions inflammatory; treatment antiphlogistic and anæsthetic. *Cerebro-Spinal Meningitis,* an epidemic fever with local inflammation of spine, involving the brain; marked by tetanoid symptoms; cause unknown; treatment unsatisfactory . . . . . . 698—700

HYDROPHOBIA—the most malignant and destructive of known diseases; beginning with reflex spinal irritation not only implicates the whole sensorial system, but vitiates all the fluids of the body; derived from the dog chiefly; hyperæsthesia intense, with dread of fluids and of air; dysphagia; spasmodic, convulsive; no definite lesions observed; doubtful if recovery ever occurs; prophylaxis important . . . . 700—704

NEURALGIA, Spinal Irritation, Tic Douloureux, Visceral Neuralgia—pathology ill understood; management empirical . . . . . . 704—708

SECTION V.

DISEASES OF THE MOTORY SYSTEM.

GOUT—Arthritis—Podagra—a constitutional diathesis; universal vice of the fluids; eminently hereditary; modifying all accidental injuries and inflammations; exhibits the phenomena of metastasis; occasions deposits of lithates; Garrod's Chemical Pathology . . . . 708—712

RHEUMATISM—now regarded as a vice of the fluids chiefly; Acute Rheumatism often implicates the heart; metastasis to other organs also; modern treatment chemical and corrective; Chronic Rheumatism a most tenacious and unmanageable malady, inflicting deformity and incapacity . . . 712—719

SECTION VI.

DISEASES OF THE EXCERNENT SYSTEM.

The office of excretion chiefly performed by the skin and the kidneys . 720

THE EXANTHEMATA.

THE ERUPTIVE FEVERS only, treated of here; neither space nor opportunity admitting the discussion of the affections of the cutaneous surface generally. The exanthemata, properly so called, have certain characteristics in common; they are febrile, eruptive, contagious, self-limiting, and attack the subjects but once; the latter an inexplicable property, subject to exceptions; the true exanthemata are smallpox, measles, scarlatina, and, perhaps we may add, dengue. Erysipelas is arranged here, but it gives no immunity—nay, rather predisposes to its own return; nor is it self-limiting, as the others are . . . 720

VARIOLA—Smallpox—originated in the East; propagated by contagion, palpable and impalpable; by inoculation, which renders it milder and distinct; confluent in its severer form; spreads sometimes as epidemic; prophylaxis by vaccination, important . . . . 721—726

VACCINE—described; its history given, and its relations to variola . 726—731

RUBEOLA, Morbilli—Measles—of eastern origin also; description; no palpable morbid secretion; inoculation performed with tears and blood; prognosis favorable; destructive sometimes to the colored races, and savages; medicine expectante best adapted; sequelæ sometimes require treatment; and complications 731—734

SCARLATINA—its source unknown; propagated by aerial diffusion and by sanguineous inoculation; its several forms—simple, anginose, malignant—mere grades of intensity; often intractable and destructive; treatment various; belladonna asserted to be protective; its renal connection and dropsical sequelæ important points in its history . . . . 734—740

ERYSIPELAS—an ancient and universal malady; its relations with ochlesis, clear; often associated with typhus fever, perhaps with puerperal peritonitis; in history, as well as treatment, differs from the exanthemata; bears and requires active and judicious treatment . . . . 740—744

DENGUE—Scarlatina Rheumatica of Copland—a modern disease; described, and its history given; its character as an exanthema established; its origin not clearly known; contagious; epidemic; probably naturalized and permanent in our country; arthritic complication; eruption somewhat irregular; duration not precisely limited; treatment, anodyne and palliative . . 744—749

DISEASES OF THE URINARY ORGANS.

RENAL AFFECTIONS—the kidneys the only exclusive depurators, having no other suggested function; subject to Nephritis, acute and chronic; to fatty or granular degeneration. Anuria—defect of secretion; rarely idiopathic; an attendant and important symptom in many diseases: morbid urines often met with; urinoscopy, therefore, a valuable method of diagnosis; blood, pus, albumen, sugar, lime, &c., found in it; deposits from it frequent; gravel, or calculi; uric or lithic acid; urate of ammonia; the earthy phosphates. Oxyluria, where crystals of oxalate of lime abound in it, often productive of nephralgia, renal-neuralgia, which may depend upon all morbid irritating urines, or the presence of all forms of calculi in the kidney . . . . . . 749—753

NEPHRITIS—Acute and Chronic: Varied forms of the latter known as *Bright's disease*—Desquamative nephritis; a general term descriptive of conditions greatly diversified; comprising much general or constitutional derangement, as well as local change and organic lesion . 753—756

NEPHRALGIA; Nervous or functional affection, hyperæsthetic, severely painful, of the kidney; often associated with palpable disorder and degeneracy, or deterioration of structure, but not always 756

DIABETES, Glycosuria; morbidly abundant flow of urine, with varied proportion of sugar; a wasting cachexy; its pathology obscure; its treatment unsatisfactory 758

VESICAL AFFECTIONS—Cystitis, acute and chronic; the former rare; the latter not infrequent, as brought on by the presence of deposits in the bladder, or the irritation of morbid urine; the organ often much thickened. Cysterethismus—Irritable Bladder—a neuropathic condition, often met with in old age, combined with catarrhus vesicæ, with incontinence of urine and frequent discharge; the secretion morbid and acrimonious; remedial management chiefly palliative 760

ADDISON'S DISEASE—Bronzed Skin; disease of supra-renal capsules, an affection recently noticed and named; obscure in history and character; doubtful in its pathology and treatment 761

PART I.

GENERAL PATHOLOGY.

GENERAL PATHOLOGY.

SECTION I.

NATURE OF DISEASES.

THE Science of Medicine divides itself conveniently and obviously into two great departments, Pathology and Therapeutics.

Pathology requires to be subdivided into General and Special.

General Pathology may be regarded as comprising the Natural History of Diseases. It treats of their nature, their origin or causes, their phenomena, the seats they occupy, their progress, their effects, and their termination.

Special Pathology includes the consideration and description of each of the forms of disease separately; the arrangement or classification of them; the recognition and distinction of each from every other, and the apprehension of all the combined elements which may concur in every individual example; and the prediction of the course, progress, result, and termination of each of the several cases.

Therapeutics—the Treatment and Cure of Diseases—must be discussed in connection with Special Pathology. Thus associated, the Practice of Physic rises into its proper rank among "the mixed and applied sciences." Without such guidance and aid, it degenerates into a mere empirical art.

Hygiene, the highest office and most important function of the philosophic physician—the Prevention of Diseases—is best treated of under the general head of Etiology, while discussing their origin and causes. Prophylaxis is the term employed to designate, amidst the inquiries of Special Pathology, the method of avoiding the particular invasion of any individual malady.

Disease, in the abstract or general meaning, is very difficult to define. It is indeed, of necessity, a relative term. It is the opposite to, the contrast, the negation of Health.

The Science of Pathology presupposes, therefore, and is based upon an acquaintance with the doctrines of Physiology, which, in its turn, demands a knowledge of Anatomy and of Organic Chemistry. As Physiology gives us the history of the natural and healthy condition and actions of the body, its parts, organs, tissues, and fluids, so Pathology inquires into the departures from this natural and healthy state, and ascertains the morbid condition and actions of the organs, tissues, and fluids of the body.

All variations from the regular, or standard, or typical condition of structure and function which occasion suffering or endanger life, and all irregularities, whether of function or structure, progressive and *tending* to occasion suffering or danger, constitute Disease. The latter clause is framed to comprehend the inscrutable changes which go on during the latent period of many diseases, and the period of incubation of all.

Mere abnormality, simple deviation from the typical standard, does not necessarily imply disease, either in the technical or philosophical sense, unless it give rise to injurious and increasingly evil consequences. There may be deficiency or redundancy of parts; harelip, or a sixth finger; these are deformities, not diseases: there may be, in a similar way, defect or intensity of a faculty or function; short-sightedness, or peculiar acuteness of vision or hearing, and so on; if these are progressive, and tending to increase of ill results, they are diseases; "if not, not."

We speak of diseases ontologically, for convenience sake only. They are not actual existences, as our phrases would often seem to intend; they are mere modes or conditions. They imply and depend upon some change in the organic structure of the solids, or in the composition of the fluids, or in the performance of some of the functions. In certain instances all these morbid elements concur, and we find palpable derangement of the form of organs, or of the substance of tissues; palpable alteration in the constitution of the fluids, and palpable perversion of function. Again, some one or other of these elements may be wanting; and thus we have a natural and obvious division of diseases into Organic and Functional. It is true that the inference is drawn by many pathologists, plausibly enough, and not unfairly, that all disease must be of the first character, that functional must involve organic change, as action is the result of structure, and that diseased action must depend upon morbid alteration of the tissues performing the functions, or of the composition of the fluids whose presence and integrity give life and power and sustenance. But however reasonable the inference, it is not yet demonstrated to be absolutely true: we often meet with cases in which no change of form, substance, or composition can be detected by the closest inspection, and are therefore compelled to retain the distinction as necessary and significant.

Diseases are further divided into Local and General. There often occur local affections of some special organ or tissue, arising from the agency of a cause which has disturbed it specially or exclusively. We also encounter instances (as in fevers familiarly), in which every organ and tissue seems implicated in the universal disorder of the system. Each of these may produce the other. Nothing is more common than to witness the radiation or diffusion of disease from an observed local seat or centre; while we have to treat every day the local manifestations of general morbid states of constitution or diathesis.

It is argued here, with no little force, that none of the causes of disease are capable of acting upon the whole body simultaneously; nay, that each of them is exclusively relevant to and fitted to act upon the susceptibility of some special tissue; and that therefore all diseases must be primarily local, however afterwards radiated and diffused. But this too is matter of inference not fully established, and the division must be retained.

Some Pathologists have taught that disease consists merely in an increase or enhancement of the natural actions of the body, or the reverse; or in enhancement or exaggeration of the vital properties of the tissues, their irritability, contractility, &c.: in other words, that morbid differs from healthy action in degree only, or intensity. This is an important and mischievous error. That there is *perversion*, not simply difference in force—plus or minus—essential difference in nature or kind of action, as well as in its degree, is proved by the changes which take place in the fluids; the blood, the secretions, the effused lymph and pus becoming specially contagious; and also by the peculiarities of diseased solids newly deposited and built up, as in fungus hæmatodes, tubercle, osteo-sarcoma, and cancer.

SECTION II.

ETIOLOGY.

I. PREDISPOSING CAUSES.

DISEASE, as Brown and Rush have said of life, "is a forced state;" it is never spontaneous. The human frame, constituted and organized in the admirable manner which it is the province of the anatomist and physiologist to develop and describe, when set in motion by the mysterious force of the vital principle, has an evident tendency to pursue in a definite method the performance of the numerous and varied functions peculiar to the living body. It would continue, doubtless, if undisturbed, to fulfil these offices in this natural way, with undeviating perseverance, until the materials of which it is constructed were worn out, or the organs of supply failed to restore the waste incurred by action; and such, indeed, is the euthanasia of the poets and speculative philosophers, so seldom, if ever, met with in fact.

The circumstances of our perpetually changing states and conditions, however, exhibit an irresistible tendency to derange the harmony of its actions, and the regularity of their progression. Disturbing contingencies present themselves on every side, and assail us at every moment of our existence. The effort to elude them altogether is, indeed, hopeless; but they can, to a certain extent, be avoided, if detected and pointed out; and their influence may always be modified and diminished by proper attention. Without a thorough investigation of their character, their sources, their history, the ordinary modes of their invasion of, and action upon, the human constitution, the physician, whatever degree of skill he may empirically obtain in the treatment of diseases, will, of necessity, remain unqualified for what I have already designated as the nobler and more beneficent department of his profession, the art of preventing them and obviating their recurrence.

Causes of disease are variously distinguished and designated, and will be best considered under these several heads.

One of the oldest divisions of the books is into remote and proximate, terms which are artificial, and require to be explained.

The proximate cause is frequently spoken of as "morbus ipse"—the disease itself; but this is absurd. It may be regarded as that particular step in the course of morbid actions arising under any disturbing influence, from which is derived the direction and determination of the succeeding series of events. This may or may not be the earliest or primary morbid movement. In many instances it probably is, but not always. For example, a debilitated subject being exposed to a sudden alternation of temperature, too great to be borne with impunity, will suffer a morbid impression. So will a robust man who sleeps in a malarious region. In each of these, the remote cause—so called merely in contradistinction or contrast—will be efficient in its own way, and will derange the functions. Both may be seized with rigor or chill; but this will differ essentially in the two, and be followed with very different consequences. The first will be assailed by whatever malady may find his system most ready to receive it. The organ or tissue which offers "least resistance," the "pars minoris resistentiæ" in his peculiar state of constitution, will be the seat of subsequent disease. There may be sore throat, or catarrh, pleurisy, bronchitis, or diarrhœa. In each of these examples, we say of the particular contingency which determined and gave direction to the train of developed phenomena, impressing on it the special character, and fixing it in the seat it occupied, that this is the proximate or constituent cause of the form of disease manifested. In the second supposed subject, malaria, the remote cause, will excite periodical fever; but this may assume an intermittent or remittent type, and be modified into the congestive, or common, or inflammatory form, according to some special condition, which would deserve to be regarded as the proximate cause of the subsequent definite effects.

Causes of disease are further divided into the Predisposing and Exciting. It is clear that these are not causes in precisely the same sense, and that our idea of proximate cause is closely allied to the first of them. Predisposition deserves a careful study, as involving many interesting and important elements. It is a passive condition, for the most part; an effect of many combined circumstances previously acting on the system. It is a state often consistent with perfect health; often lies on the doubtful line; and often constitutes so strongly pronounced a diathesis, or proclivity to morbid perversion of action, or vice of structure, as to deserve to be regarded itself in the light of serious disease.

Predisposition is often original; it may be acquired normally, or arise from morbid change. It may be in either case permanent; and it may be connected with, or dependent upon, transient and varying states of the system. I have said that it is often a passive condition; the tissue or organ, in which a morbid proclivity is exhibited, is spoken of as a point of weakness and of imperfect resistance. But this does not express all that requires to be considered. In the production of diseased action, the cause must be relevant to the susceptibility acted on. We say that the eye sees; it is a mere recipient of light. But vision implies a relevancy between the qualities or properties of light and the susceptibility of the eye. Excitants, of whatever character, can act only on susceptibility, which, being a vital property, must partake of the nature of force or power. A vital capacity can hardly be conceived of as merely a passive quality; it reacts when acted upon. Susceptibility is obviously the source or basis of predisposition, which must therefore partake of the active or reactive capacity. Thus it happens that we frequently find organs and parts well developed, and gifted with more than average power, as far as can be known, attacked by disease. Once for all, let it be stated, that we have no means of measuring the vital power in any tissue or organ. The phrenologists teach that in the brain it holds a direct relation to the bulk, or size, or quantity of matter; but this cannot be proved. If it were true, we know that a large brain is at least as likely to become diseased as a small one.

Original predisposition may be—

1. Idiosyncratic, or personally constitutional.
2. Parental, or hereditarily constitutional; and
3. Tribal, or derived from the characteristics of race.

1. Of the first, we find instances, in the apoplectic form, where a short neck gives the blood a rapid and forcible entrance into the cerebral vessels; in various malformations of the thorax, rendering the subject liable to disorders of respiration; in certain vices of the blood, or the tissues containing it, which dispose to hemorrhage, or to exosmose of serum, as in dropsy; or to ready ecchymosis, or ulceration from slight hurts. We class here all the sympathies and antipathies, and many eccentricities, bodily and mental. A majority of mankind are liable to sea-sickness; but there are only an unfortunate few who can never be accustomed to the motion of a ship on the water. A similar peculiarity prevents some from swinging, or riding backwards in a carriage. Some are always assailed with vertigo on ascending a height. We meet with some who suffer greatly from catarrh, or asthma, when they breathe the fragrant odors exhaled from the sweet meadow-grass in hay-making. Nay, we have on record instances in which the smell and even the sight of a rose brought on syncope both in male and female subjects. Many of our medicinal substances are found to arouse a special reaction, or affect a special susceptibility in certain examples; a fact which should suggest practical caution. Thus the smell of ipecacuanha excites dyspnœa, asthmatic, or quasi-asthmatic, in some persons. Opium, and ol. ricini, and calomel are invariably nauseants or emetics to others; and antimonials, to the mass of patients one of our most certain relaxants, will, in others, produce the most vehement spasms, and muscular contractions and cramps.

2. *Hereditary* predispositions are particularly worthy of notice. They constitute the strongest proclivities that we know of: nay, the fact is familiar and proverbial, that diseases themselves are hereditary. All personal peculiarities seem to be transmissible, but the law of transmission is not clearly made out, and many curious anomalies present themselves to our observation. Certain specialties of conformation are more readily carried down than others; certain eccentricities, likes and dislikes, sympathies and antipathies. The vital duration or probable longevity; the mode of death; the distribution of vessels; the propensity to certain habits; all these are conveyed to offspring. We have families subject to headache; to lunacy; families of "bleeders;" scrofulous and gouty families, who suffer the penalty of ancestral habits and modes of life, even when living in contrasted conditions and habits. Hybridism of ill-adapted or unconsonant stocks gives rise to many and varied evils. So also does the too exclusive connec-

tion of relatives. Deaf-muteism and blindness offer us some striking facts in illustration of this law of parental derivation. We shall not find the record free from apparent irregularities, or even seeming inconsistencies. Sometimes a generation or two is left out; the direct line often escapes, while collateral relatives suffer. It is commonly noticed that among the numerous families of "bleeders," as they are called, as being subject to unmanageable hemorrhage from slight wounds, abrasions, &c., although the hereditary peculiarity descends in the female as well as the male line, yet it rarely shows itself in the women or female children. From the records of the Paris Institution for the Deaf and Dumb, we learn that one family of 10 children affords 7 deaf mutes; the father's aunt having been a deaf mute. In the London Asylum, sixteen families have furnished 71 subjects, their whole number of children being 100. In the history of hereditary blindness, marked anomalies present themselves. In one family of 8 children, within my knowledge, 5 are blind; the parents' eyes being good, and no reason for so great a misfortune being discoverable. Chapin (of the Pennsylvania Institution for the Blind) tells us of "one family of 7 blind children, another of 3 blind children and an idiot child, several of 2 blind children in each, and an indefinite number with one blind child in each—the parents being cousins;" and ascribes the defect unhesitatingly to "the intermarriage of relatives, particularly of first cousins." But this intermarriage is exceedingly common in many portions of our country, and especially favored in many others, where the consequences thus ascribed to it are not observed, and indeed do not present themselves. The same author gives us the following interesting statements on the subject:—

"In the Hôpital Royale des Quinze-Vingts, in Paris, founded in 1260 by Louis IX., the blind inmates are encouraged to marry with each other. The community numbers 870 in all, in 245 distinct families; of whom 113 are children born in the house. All these children have one or two parents blind, but not a blind child had ever been born in the house. I have known of some twenty marriages in this country in which one party was blind, and several where both were blind, but the offspring in every case have good sight. It would be incorrect, however, to infer that blindness is never transmitted by blind parents. I know a young lady whose progenitors for five generations have been blind—at least one of the parents—in succession. Sometimes nature seems eccentric in her operations. A lady in Ohio had three blind children; neither the parents nor grandparents of the children were blind, but the lady's brother had two blind children, and she had also two uncles blind."

Nature is never eccentric in her operations; her laws are uniform and unrelenting; but they are often obscure, and we must collect facts widely and industriously, from which to learn their course and nature. We may be aided by observations in comparative Physiology, vegetable and animal. Seedlings, as gardeners tells us, vary capriciously; grafts convey identical or closely analogous qualities. The hybridism of the lower animals is more definite in its results, and constitutes an object of special attention to the farmer. Yet there is frequent disappointment here too as to the transmission of desired qualities and the correction of observed defects. These irregularities, while they embarrass us in our reasonings, afford us, however, ground of vague hope in individual instances, and are therefore recited here. I only add one remark, that nature not unfrequently passes over, we know not why, one generation or more in the hereditary communication of predispositions. So the salpa, we are told, exhibits identical peculiarities in alternate generations; and still stranger, the cercaria offers us a similar regular succession in alternate fives; that is, the first five generations differ each from every other, but resemble the next five in regular progression: the 1st and 6th, the 2d and 7th, the 3d and 8th, and so on.

3. Predisposition of *race* or *tribe* must next be spoken of. National characteristics are, of course, in a certain sense hereditary, but their origin is of wider and more varied extent than can be included under the head of mere parental descent. Color is the most natural dividing line of the races, but its influence, if it exert any, is so mingled with other agencies that it is but vaguely understood. The white man everywhere exhibits a more ready proclivity to periodical fevers and other diseases derived from what we call malaria, and dies of them in larger proportion than the colored tribes. These are all susceptible specially of the exanthemata, and yield to their attack. The Red Indian melts away before smallpox; the Polynesian disappears under the milder infliction of rubeola. The black is liable to tetanus and cholera, which are comparatively fatal to him.

Temperaments seem to me, when at all pronounced, to be rather topics of pathological than physiological discussion. They constitute modes of predisposition, the result of hereditary and tribal peculiarities. Though their importance has been exaggerated, and the description of them greatly intensified, they are truly worthy of our attention as manifesting tendencies or proclivities which should be watched and appreciated. Thus, in the sanguineous temperament we have depicted a notable activity of the circulation with peculiar facility in the process of sanguification. Hence arises a particular liability to inflammations and other maladies, of which hyperæmia is a part, or which depend upon the force or momentum with which the blood is propelled, as apoplexy, hemorrhage, &c.

In the phlegmatic, we have a condition of the vascular system contrasted with the above. Blood is made slowly and imperfectly, and circulates quietly and languidly. There are torpor and sluggishness of assimilation, nutrition, and secretion, with consequent liability to glandular obstructions, morbid deposits, and transudation from the atonic capillaries. The Dane and the Hollander may be indicated as offering examples of the physiognomical and pathological contrast thus described.

The nervous temperament, sometimes also entitled the poetic and the melancholic, is characterized, as these phrases import, by inordinate susceptibility of the sensorial system—the brain and nerves. The senses are acute; the faculties of the mind rather keen and active than strong or well balanced; the imagination especially lively. These qualities imply great mobility and excitability, physical, intellectual, and moral. The functional movements of all the organs are readily modified and disturbed. Spasmodic and convulsive affections promptly follow any mode of irritation. The spirits are easily elated and depressed. Hallucinations, eagerly admitted and warmly entertained, run into many varieties of insanity; while the restless and eager desire of excitement soon brings fatigue, satiety, ennui, and despair in its train. It is chiefly from this temperament that the unblest grave of the suicide is filled.

We must not omit to observe that these several temperaments—the constitutional peculiarities referred to under that comprehensive word—run into and mingle with each other, so as to be found usually combined and complicated, seldom absolutely simple. In like manner the individual peculiarities to which they give rise will be multiplied, varied, and modified in a definite relation with the diversities of structure and conformation with which they are indissolubly connected.

Of *acquired* predispositions we may distinguish the normal and the morbid, the transient and the permanent. Many of these are incidental to our modes of life, our habits, our avocations. All classes and grades of men, all trades and professions have their besetting maladies, invited by the states of system engendered and built up. The diseases of the civilized man, setting aside exposure to exciting causes, would differ from those of the savage; the manner of living of the gentleman predisposes him to some diseases not likely to affect the artisan, and protects him from the tendency to others. Students are more liable to cerebral disorders; hard labor, while it develops muscular strength, gives liability to rheumatism; it is everywhere the working classes that suffer most from cholera, typhoid fevers, and indeed all epidemics.

Of all transient predispositions, sleep is the most deserving of our study. Its relation to various maladies varies exceedingly, and is often deeply interesting. Sleep is the correlative of sensibility, the psychical action, as death is the correlative of life, the organic action. Death implies destructive change; sleep, restorative change. Yet it is curious to observe that its immediate causes are such as tend to impair and injure the organism, and its proximate cause, or the condition which determines it and in which it may be said to consist, is scarcely distinguishable from disease. Two elements seem to be always present in sleep; a vascular congestion, giving intravascular pressure upon the brain, and a collapse or passive state—the opposite of erethism or tension—of the cerebral fibres. Thus we seem to understand why apoplexy and epilepsy so often come on during sleep. The tendency is aided doubtless by the recumbent posture indulged in. Marshall Hall advises that the epileptic should not be allowed to sleep soundly at any time. I have noticed in some of my patients a special liability to a paroxysm at the moment of waking; just when the brain may be supposed to be arousing itself to a state of activity from its repose. But we have not yet explained why croup and asthma assail us during the first hours of sleep, and the terrible spasmodic dyspnœa of hydrothorax; nor why cholera, and diarrhœa and colic, attack when we have slept some time, or just at early morning; nor why the vomiting of the pregnant woman is most troublesome just upon waking.

Contrasted with these facts, let us remark that malarious fevers rarely, if ever, commence their attack during sleep. I have never read nor heard of the first paroxysm of an intermittent coming upon a sleeping patient; and after constant inquiry for thirty years and more, have not been able to collect a dozen instances in which the state of sleep was not absolutely protective from succeeding paroxysms. Yellow fever, on the other hand, is at least indifferent to it, and not seldom arouses the startled slumberer by its unwelcome visit. Neuralgia seems to respect sleep, no matter how frequent or habitual its annoying inflictions, and rarely, if ever, awakes him with its intolerable pangs, so sure to return within a brief period after his interval of happy forgetfulness is broken.

Some diseases create or engender a tendency to their own recurrence; some give predisposition to other diseases. Of the first we have numerous examples in the paroxysmal and recurrent affections, such as intermittents, epilepsy, asthma, which sometimes leave no trace by which we shall explain their obstinate tenacity. The medical authorities of Great Britain have of late years recognized a form of continued fever, in which this tendency is so characteristic that they have entitled it "relapsing fever." Gout, rheumatism, ophthalmia, leave behind a similar proclivity, perhaps by force of some change in the organic condition of the tissues which they affect.

Instances of the second kind present themselves in the readiness of all other forms of fever to become typhoid in character; in the consecutive dropsies which follow many visceral affections. Smallpox predisposes to pneumonia; measles to diarrhœa; scarlatina to renal disorders. But what shall we say of the opposite or contrasted predisposition, where a disease gives immunity from its own return or protection against the attack of another? Nothing can be more obscure than the question as to the method in which this is brought about. The exanthemata and pertussis, as a well-known rule, affect the constitution but once. This is true of yellow fever; and in a less degree is observed as to typhus and typhoid, and indeed numerous other maladies. Vaccine protects against smallpox still more mysteriously. Those who believe them to be identical, must wonder even more that this protection is not reciprocal; that smallpox, which secures against its own recurrence, does not prevent the vaccine; neither does vaccine interfere with its own second and third intrusion into the organism.

Predisposition is direct and indirect, definite and indefinite. Of the direct and definite we have instances in the latent period of intercurrent diseases and in the stage of incubation. Here the subject is in that doubtful condition formerly alluded to, lying on the boundary between health and sickness; but the tendency is so precise and well defined, however perfectly well he may seem, that we not only know *how* he is to be assailed, but *when*. Indirect and indefinite predispositions are found in the relations of sex and age. The maladies of early life are very different from those of advanced age. Croup rarely assails an adult. The exanthemata and pertussis affect childhood chiefly. Male infants are more liable to hydrocephalus than females; girls are oftener subjects of chorea than boys. Women are seldomer assailed than men by bronchitis or apoplexy, and I think also by epilepsy. They are almost exclusively affected with hysteria, and exhibit greatly oftener than the opposite sex the phenomena of chlorosis and anæmia or spanæmia.

II. EXCITING CAUSES OF DISEASE.

Under this general head we speak of all those contingencies which are immediately efficient in deranging the animal economy, and producing an abnormal or morbid impression. They are infinitely numerous and diversified; including indeed all agents which affect the tissues in every way, or vary the composition of the fluids. The air we breathe, the food we eat, the beverages with which we quench our thirst, our dress, our habits, and modes of life and occupations; all the movements and circumstances through and by which we are brought into connection and harmony with universal nature, all may become instruments of destruction and means of death.

Besides these substances and their modes of innocent agency or indifferent character, we are surrounded by a large class of known and unknown influences which impress us only or chiefly for evil, and which are always discordant with the normal and healthful movements of the organism.

The former are injurious only by *excess* or *unadaptedness;* the latter by their characteristic qualities or properties; and thus we are led to institute a very obvious but important distinction of the exciting causes of disease into the *Incidental* and the *Specific.*

Incidental causes of disease give rise to no uniform or constant modes of derangement; their effect being always relevant to and determined by the existing predisposition, or predisposing condition of the system at the time of their application.

Specific causes may be spoken of as *poisons;* their mode of disturbance is uniform and constant; their effects, though admitting certain limited modifications, may be definitely predicted; they are independent of, or paramount to, all predisposing conditions of the system. We shall hereafter see that these specific poisons are further divisible into two classes. The first is not absolutely independent of quantity, but admits of a certain extent of safe application which is greatly influenced by habit, and may be distinctly graduated. The second, distinguished by a particular term, is equally and alike efficient—if efficient at all—without respect to amount or quantity applied. Such a cause of disease we speak of as a *Virus*, and recognize in most of the forms of contagion.

INCIDENTAL CAUSES.

I have attributed the hurtful influences of incidental causes of disease exclusively to excess in amount, or form of application, or to what I have called unadaptedness. I must explain these phrases. *Excess* is a relative term, whose boundaries are changing and undefinable. It prepares the way for disease and ushers it in by exhausting the vital power of the tissues. If these continue to react, in their own characteristic manner upon impressions made on them unremittingly or in undue vehemence, this exhaustion will be complete and destructive at once. If, on the other hand, they lose the capacity of reaction, and become passive, they suffer, from the presence of any excitant, all such change and disorganization, whether mechanical or chemical, as shall be determined by the nature of such excitant.

Unadaptedness also requires definition and illustration. I cannot find a word more fairly expressive of such occasional condition of any part or parts as shall unfit them to receive an impression not necessarily or in its own nature injurious, but inflicting injury by reason of its discordance with the existing state of the body. Thus, the prehension of food by one laboring under great fatigue will be followed by indigestion. Active exercise of the mind, too, as well as of the muscles, anxious thought or profound study, will also incapacitate the stomach for its functions, and make a simple meal injurious. Hence also habits formed upon diurnal revolutions cannot be traversed with impunity; horses and men that labor by night, instead of by day, wear out prematurely. All habits, however formed, generate a course of movement, any abrupt change of which shall develop this condition of unpreparedness or unadaptedness. The late hours of the city derange the health of the countryman, even though he may devote the same proportion of his time to sleep. Some persons of strong digestive powers are made ill by suppers, because unaccustomed to eat at night.

We may treat of incidental causes of disease under the several divisions of—the *climatic;* the *dietetic;* the *personal;* and the *social.*

1. CLIMATIC.—The word climatic comprises a great diversity of circumstances, atmospheric and geographical; the temperature, moisture, barometric and electrical states, and the prevailing winds of the region or district of country; the soil, surface, and exposures, hill or valley, sea-shore or lake, or river-bank, mountain or plain, forest or prairie.

Heat, although among the most essential of all excitants to the well-being of living bodies, is among the most frequent and familiar sources of disease. Its direct effect is shown in its influence upon the circulation, producing apoplexy, phrenitis, hemorrhage. The vital fluid is not exempt from the law of increment of volume upon addition of caloric; and, thus distending the vessels, it occasions congestion, or escapes by transudation, or by disruption, or laceration of tissue at the "part of least resistance." This may differ, in different individuals, at different times, and in different places. Insolation, which, under my own notice, and that of many others, is a cerebral affection—apoplectic, or simulating apoplexy, was found, by Dowler, of New Orleans, to offer no other lesion than a profound pulmonary congestion. Russell, too, in Madras, examined three cases of *coup de soleil* in which the brain was uninjured, but the lungs "congested even to blackness throughout their entire extent." Pepper, of Philadelphia, discovered no unusual appearances in four such cases, except in "the heart, which was pallid, flaccid, softened, with its lining membrane and that of the large bloodvessels of a very dark, almost purple color," and ascribed all the phenomena to mere "nervous exhaustion."

It is apposite to our purpose to remark that this malady, though the obvious result of high temperature, is not always or everywhere frequent in proportion to the degree of heat. This incidental character of its influence is shown by the following facts. It is not alike frequent in different places in the same hot summers, even comparing localities equally marked by heat. In 1824, Charleston suffered greatly; more persons dying of *coup de soleil* than in any twelve other years. New York presented in 1853 a very extraordinary number of such accidents, not less than 260 being recorded. In no previous year had there been more than 36, and the average is calculated at 18. New Orleans had her turn in 1854, when her sister cities escaped. Mr. Lewis, the mayor, in his annual message to the Common Council of that city, affirms that, "towards the close of June, sunstroke prevailed epidemically, so to speak."

To the indirect and diffused influences of high temperature, all the diseases of hot climates have been in turn ascribed. It does, no doubt, greatly promote the frequency of gastric and hepatic disorders, by its excitement and irritation of the cutaneous surface, and consequent relaxation of its exhalant vessels.

Cold, long or intensely applied, constricts the skin, and, by expelling the blood from its vast network of vessels, occasions a host of diseases of undue and irregular determination, catarrh, bronchitis, pleurisy, enteritis, &c. Heat is best borne by the dark tribes; the white man and the red Indian bear cold with least injury. The immediate effects of cold, which Fleurens says, emphatically, "is a positive poison," show the infinite importance of caloric as a vital stimulant. The constriction of the surface, if long protracted and severe, by driving in the blood from it upon the internal viscera, the brain and lungs, will produce congestions, torpor, and dying sleep. Cold is a powerful anæsthetic; it subtracts from the living susceptibility of every tissue and organ, thus diminishing their vitality, and, consequently, unfits them for the performance of their functions.

Alternations of temperature are dangerous, and everywhere dreaded. Everybody fears abrupt exposure to cold when the body is heated; but, it ought to be known by all, that the contrasted change of heat after cold is at least equally likely to prove injurious. Such alternations, however, within certain limits tend, undoubtedly, to confirm and invigorate human health. Poets alone eulogize an eternal spring; and the highest animal tone and strength of constitution belong rather to cold and changeable climates, than to those which are warm and equable. But the changes which in lofty mountainous districts occur between the night and day, and which constitute the delightful and salubrious variety of the seasons, may be excessively and unadaptedly abrupt, and thus excite disease. Yet, that these evil influences depend upon a present varying or occasional unadaptedness, rather than degree or suddenness, is proved by the practice of Priesnitz, the father of hydropathy, and the Russian habit of plunging, for recreation and without injury, into the snow or ice-cold river water, on emerging from the hot vapor-bath.

Moisture is familiarly regarded as unfriendly to health when abundant in the atmosphere. Yet this is not uniformly true either in hot or cold climates. In Great Britain, where human life is at its highest point, and its average duration unsurpassed, both the hygrometer and the flourishing vegetation show a very moist air. In southern latitudes, too, where moisture is still more dreaded, we find some striking exceptions to the general law of its insalubrity. In the bayous of Louisiana, the inhabitants live long and free from sickness, we are told, in an extraordinary degree. "The singular healthfulness of Galle, a peninsula in the island of Ceylon, is one of these marvellous anomalies. At this spot, above a mile in circumference, commanding the entrance to an extensive bay, the mortality for 17 years has averaged only 23 per 1000; and this includes the deaths of the sick sent from other stations. The deaths in the whole island have been 75 per 1000 annually." A still more wonderful instance is said to be presented in "the cantonment of Moelmyne, in the Tenasserim provinces in Hindostan. It is within 17° of the equator; the thermometer occasionally standing at from 96 to 98 in the shade, sometimes exceeding 100°. It lies in a plain about a mile broad, between a ridge of hills and the river Saluen. Beyond the ridge of hills an immense alluvial plain extends in every direction, watered by three rivers uniting opposite the cantonment. The whole vicinity may be designated a country of water, marsh, jungle, and rank vegetation. It is so moist during the wet season that metals are constantly in a state of corrosion, wearing apparel completely saturated, and articles of wool or leather covered with mould in the course of a night. During the four years, from 1833 to 1837, though invalids from other stations were sent hither for recovery, the deaths have been fewer than would have occurred among an equal number of troops in England."

We have not observed the influence of *barometrical* changes, except in extreme examples. At lofty mountain elevations, where the density of the atmosphere is greatly removed, respiration becomes hurried and panting, and quick fatigue follows any muscular exertion. The laborers taken out from England to work the mines of Real del Monte, in Mexico, suffered much from this form of dyspnœa, and their dogs were found, from the same cause, useless in hunting. At still greater heights, the parietes of the vessels, unsupported by the atmospheric pressure to which they were accustomed, often yield, and hemorrhage takes place.

Much has been said of the *electricity* of the air and earth as modifying the health of various localities; but I cannot venture to affirm that anything is, as yet, clearly known on this subject. The same is more emphatically true as to *magnetism*, terrestrial and celestial, perhaps only another mode of electrical force. There is here a wide field for observation, and probably useful discovery.

The prevailing winds of any region doubtless affect its salubrity. Pretermitting all reference to merely local circumstances, the northwest is usually cool and tonic, the south and west winds balmy and soothing. *Easterly winds* are everywhere disagreeable and uncomfortable; often directly and obviously injurious. They are dreaded alike on the continent of Europe and on the shores of this western world; upon the Mediterranean Sea, and along the coast of the British islands. Everywhere their presence and nature are proverbially suggestive of evil, and we use thus significantly the names of the Levanter, the Khamseen, and the Sirocco, and the Simoom.

Change of climate is a very familiar cause of disease in the present era of unprecedented emigration. Vegetables and the lower animals are deranged by it, as well as the human race. All climates, indeed, are inhospitable to intruders, who must undergo more or less suffering before they attain a sufficient assimilation or adaptation to their new circumstances. Such *acclimation*, it should be observed, does not refer exclusively to temperature, but to many other elements beside. It may be possible as to heat and cold, and their alternations; but we must take into consideration the relevancy of the various constitutions of the several tribes or races. It is a matter of very serious question, whether in strongly contrasted climates acclimation is at all attainable. Vegetable life is compatible with transference, only to somewhat congenial regions; the cocoa-nut, banana, bread-fruit, and sugar-cane perish surely if removed far from the equator. Animals differ greatly in their capacity for emigration, and are found to be removable almost exactly in proportion as they are susceptible of domestication. The lion and the tiger occupy a very narrow space on the earth's surface; while their congener, the cat, follows his master all over the world. Man, especially the white man, has expanded his sphere by his intelligence; he may never become acclimated perhaps in Africa, but he lives and "keeps up his number" in all the other quarters of the globe. His improvements in civilization enable him, not properly to resist, but to evade successfully almost every variety of climatic change and infliction.

Even with all these aids, the black is infertile and ill-developed in northern countries. The red man only emigrates when compelled, and has not yet seemed to prosper in any new domicile. Of the tawny races, we know of no great removal until recently, as of the Chinese to California; and the result is not, thus far, such as to give very favorable promise.

Geological and mineralogical influences upon human health have not as yet been clearly or satisfactorily defined. The rocks and soil of any region must impregnate the waters drank by its inhabitants, and may give out exhalations of characteristic quality. There is no want of conjecture upon these topics. Many physicians of our interior country are disposed to attribute milk-sickness and other epizootics to arsenical or sulphurous effluvia from the earth. Under the head of malaria I shall refer to the evils often attendant upon the turning up of new soil, and the notion that volcanic districts are insalubrious, either by the evolvement of deleterious gases through the force of internal fires, or by the fungiferous qualities of the tufa abundantly spread abroad.

I think that there can be no doubt of the effect of limestone in some of its forms, upon the condition of the inhabitants of the districts of which they form the prevailing rocks. They disintegrate and affect the quality of the waters drank to such an extent, that strangers cannot fail to suffer from disorders of the bowels produced by them. Even the natives and long residents who usually drink them with impunity, are brought by their habitual use into a state of predisposition, which renders the prevalence of intestinal affections among them more frequent than elsewhere, more widely epidemic, and in larger proportion fatal.

They generate also a similar tendency to renal disorders. It seems to be proved that urinary calculi are of more familiar occurrence where lime-water is the only beverage, than in freestone countries.

Argillaceous soils were formerly supposed to be eminently or almost exclusively liable to malarious fevers; it is now known that this notion is untenable. Clay basins, by retaining water, which thus becomes stagnant and offensive, do undoubted injury, but in no other way.

As to the mineral effluvia which have been imagined to contaminate the atmosphere in districts of metallic quality, and over mines of lead, &c., nothing is clearly known. We see no prevalence of disease in the vicinity of the burning springs, where carburetted hydrogen is poured forth; nor in the neighborhood of watering places, where sulphuretted hydrogen and carbonic acid form the attraction of numerous fountains.

2. Dietetic.—Man is an omnivorous animal, and subsists on an indefinite variety of articles of *diet*, among which we shall, of course, find many things possessed of qualities more or less dangerous, and likely to become injurious from modifying contingencies. All neutral azotized substances containing albumen, fibrin, and casein, are nutritious. To these essentials we add with safety, and doubtless with great advantage as well as enjoyment, many other elements, as fat, or oil, gelatin, sugar, condiments, etc. Magendie has proved that animal life cannot be supported by an exclusive use of any of the merely nutritious principles; there must be intermixtures, or as it were dilution. We cannot live on either gum, or oil, or sugar, alone. Variety and quantity are necessary; concentration and monotony pall upon the taste, diminish the appetite, and impair the digestion and assimilation. Under particular circumstances, such concentration and monotony may be borne for a time. The hunter and trapper of our vast western prairies, subsist during their excursions, upon animal food alone, either dried or fresh. The Arab, we are told, may live for a few days upon gum only. But in general, any exclusive diet is followed by debility and emaciation. Salted meats and fish, taken without the admixture of fresh vegetables, are surely injurious in the end. Hence sailors on long voyages suffer

from scurvy; but this is sometimes, too, the result rather of monotony than of any special qualities of the food, and is relieved by variety or extension of the list of articles taken.

The diet should have some relation to climate and season. In summer we may not dispense with fruits and green vegetables; in winter animal food and oils are suitable. Some articles are more readily liable than others to become injurious from obscure contingencies. Fish and shell-fish derange many habitually, producing cutaneous eruption, diarrhœa and cholera. At particular seasons, when not in good condition, they are dangerous to all. Condiments are on this doubtful line; disagreeing with some always, with others readily, if used in increased quantity or at unaccustomed hours or in unaccustomed combinations. Fruit eaten in cities may be said to be always employed with some risk, especially to children. To be transported from the place where it grew, it must be plucked somewhat unripe, and instead of mellowing properly, may undergo some kind or degree of decay or decomposition.

The preparation of food is a matter of great consequence to the health and comfort of civilized man, and *cookery* has become one of our most important practical arts—it can scarcely be yet denominated a science. To disparage or neglect it is unwise and unreasonable. Physicians should always promote its cultivation. Its object is, while it renders our food more agreeable to the palate, to prepare it for the solution and other changes it must undergo in the stomach. In this country, it may be affirmed that we have the worst possible cookery, and hence indigestion or dyspepsia prevails almost as a national infliction. But our custom of hasty eating and our almost universal habit of chewing tobacco tend also to the same result. Mastication, the instinct to perform which seems to be lost in the children of civilized parents at least, should be taught to every child when its teeth begin to present themselves. One of our writers ascribes some of the effect to our inordinate use of alkalies, salæratus especially, in our breadstuffs, which are indeed themselves manufactured in every form of mischievous diversity, eaten hot and so mixed with syrups and condiments as to tempt strongly to excess. Salt is the subject of dispute also; and while some attribute great injury to our abundant use of it; others defend it as a natural want—shown by the intense fondness animals are apt to display for it, by thronging to "Salt Licks," and punctually attending at any fixed time or place for receiving portions of it. Yet it is not true that all animals obtain or use it, and we do not know that in a wild state any of them suffer seriously for the want of it.

I do not feel disposed to enter into the dispute urged by the advocates for confinement to vegetable diet. That such a diet may be sufficiently varied and nutritious to afford abundant subsistence and sustain long and active life there can be no doubt. At a recent meeting of the Vegetarian Society, there were present many hale old people of both sexes. But equally great numbers of old and sturdy men and women may be found, who live principally, if not exclusively, upon animal food. In regard to the pleasures of the table, excess is, as everywhere else, a relative term. The meal easily digested to-day, or at dinner, may, to-morrow, or at supper, oppress and irritate the stomach; habit here exerts, also, its universal influences. Unaccustomed articles of diet should, at first, be taken sparingly. It is said that the famishing Irish were greatly disordered by the corn meal sent out to them from this country, and, indeed, we know that strangers do not always partake of our favorite hominy with impunity.

We must not lose sight of the influence of *idiosyncrasies* in this matter. The most innocent, nay, the choicest articles of food, are injurious to some persons by an obscure and inexplicable unadaptedness. I can add to the great number of such, which may be found in the books, a very remarkable instance. I knew a lady who suffered invariably from oppressive nausea and frequently vomiting also, if she partook of anything containing the smallest portion of egg mingled with it in any way. There was in this case, too, an almost incredible acuteness of perception, forming an instinctive safeguard against any mistake; she was aware of the presence of an egg, whether cooked or raw, and even became restless and uneasy when an unbroken egg was brought near her. The article being easy of concealment was often experimented with, and the result always the same; she was rendered uncomfortable, became sick, and complained that she was annoyed by the smell and flavor until it was removed. It is possible that this instinctive revolt against articles injurious from idiosyncrasy may not exist; nay, it is possible, every one may have known such examples, indeed, that an individual may be specially fond of what is specially hurtful to him; and this should lead every one who labors under indigestion to inquiry and experiment, that he may discover and avoid the noxious food.

Our *drinks* are almost as varied as our diet, and the diversity is both agreeable and beneficial; yet here too we find many things injurious incidentally, and by excess, and unadaptedness, rather than by their own characteristic qualities. Waters of very different qualities are used to quench thirst in different localities, and custom seems to render them harmless. Water exists nowhere in nature pure, containing salts and vegetable matters in solution, and holding suspended much insoluble matter. An interchange becomes an exciting cause of disease. River water will derange those accustomed to drink of springs; those habituated to either will suffer from the use of wells or tanks. Rain water, though mixed with many impurities, absorbed in passing through the air, especially over cities, appears to be least obnoxious and most generally safe and wholesome. Limestone waters give a general readiness to renal and intestinal derangements.

Man is the only animal who drinks while he is eating, and it is worthy of consideration whether this habit is not hurtful. The gastric juices must be thus diluted, and the temperature of the stomach lowered greatly. This is especially true at the present day, when all our beverages are either drank as hot as we can swallow them, or cooled by ice nearly to the freezing point. Those who follow abruptly a basin of hot soup with a draught of iced water or champagne, unquestionably run an unphilosophical risk, the consequences of which they will not always probably evade.

Instinct leads men everywhere to the use of stimulant beverages. *Wines* of infinite variety are made in various countries. They seem to me, when used in ordinary modes and quantities, to be perfectly consistent with health; as much so, indeed, as the waters drank everywhere, impure as they generally are, and impregnated with a great diversity of saline and other matters. By wines, I mean the juices of the grape, fermented and kept from decomposition at a well understood stage of fermentation. Even at a further stage, when they become vinegars, universal experience has sanctioned their employment. But these acids are, I think, more frequently unsuited to the stomach, and the limit of excess more readily reached than in wines. The same observations hold good as to the products of fermentation generally, cider, mead, metheglin, beer, ale, and porter. Men may employ them freely without injury. Not so with the products of *distillation*, which, I believe with Haller, are all of more or less injurious tendency. The powers of accommodation in the human system are, indeed, almost unlimited, and thus we see them taken daily and in great quantities without apparent disadvantage; but the tendency is unquestionably as I have affirmed, and it is found difficult to avoid excess on the one hand, while on the other, frequent injury is done even by their moderate employment in inappropriate circumstances or conditions. *Alcoholic liquors* are all unsafe, physically as well as morally.

Tea and *coffee* have been subjects of much dispute among ultra-hygienists. These "cups that cheer but not inebriate," are among the best gifts of Providence. They are well adapted to the instinctive needs of the great multitude of the human race, although, doubtless, unsuited to certain idiosyncrasies. Containing a common principle, as chemists affirm, theine or cafeine, the combinations into which it enters in each, gives them some special qualities, while they effect alike the great purpose of gently stimulating or exciting the nervous system. In addition to this, it is believed that they arrest, in some degree, or retard the oxydation, the waste and wear of the tissues of the body. Diluted with milk and mingled with sugar, in the usual modes and quantities taken in our country, they are not only unobjectionable, but useful and nutritious beverages.

3. PERSONAL habits must be discussed in this hygienic view of the exciting causes of disease. *Dress* requires to be adapted to season and climate, as also to transient and varying conditions of system. Formerly, as De Quincy tells us, hardihood consisted in bearing heat; in modern times, the soldier proves his powers of endurance by bearing cold. Animals have their pelage altered in different seasons to fit them for the temperature; man must follow the example. To defend himself from cold and alternations of temperature, wool is the best material, and, so far as I know, has no objectionable qualities in cold and temperate climates, in which it may be worn at all seasons. The officers of the British army and navy of the east adhere to their close hot broadcloth garments in the burning tropic, and sweat and swelter in the heats of Hindostan. Cotton is perhaps next to woollen in general adaptation; but if the observers of ozone and its properties

are right, it does not protect against this agent very thoroughly. The ozonometer is said to become blue under cotton cloth very readily. Flax is worst of all, perhaps, as a ready conductor of heat and a reluctant absorbent of moisture. Silk is supposed to present some special qualities or properties which adapt it to the use of those who suffer from electrical influences. Fashion demands great sacrifices of health and comfort in regard to dress, which are readily made by her votaries. Men wear stiff stocks or thick cravats about their necks, even in hot days and nights; and women denude their fair necks and beautiful bosoms to the keen winds of winter. They cover the feet with delicate silk and thin slippers, and thus decimate themselves annually with cheerfulness. More especial care should be taken with the dress of young children, who often suffer greatly from mismanagement. These require to be protected from the weather and its changes. It should not be forgotten by parents that boys exercise with great violence, and when heated and fatigued are apt to throw off clothing and seek the coolest places within reach, thus undergoing extremes which are excessive and unfit for them.

The female corset or "stays" with their appendages have been subjects of reiterated and severe animadversion. They are susceptible, however, I think, of a fair defence. They are not necessarily hurtful, but do injury only by excess or want of adaptation. They give a graceful support to the form, which, in a large majority of instances, they unequivocally improve by imparting an air of firmness and neatness. The athlete always girds his loins for the contest, whether of wrestling or running; and even the charming mother of Cupid became more irresistible when she encircled her symmetrical waist with the cestus. Matrons feel the need of "supporters," and encourage the ingenuity of those who provide them with suitable arrangements.

The evils of the corset have been, I am persuaded, greatly exaggerated. If laced too tightly, it must compress the thorax and impede the respiration; it may also constrain the abdominal viscera, and render the motions of the body inconvenient and awkward. Yet I do not remember, in nearly forty years' practice, to have met with any definite example of deformity or injury from this cause. I have more than once seen the breasts hurt and inflamed by having the steel piece or whalebone in front too broad, so as to press upon them, but this was soon relieved.

Attention to the person by ablutions of sufficient frequency are to be enjoined upon all. The Anglo-Saxon is perhaps of all the tribes of men least addicted to the *bath*, a necessity as well as a great luxury. The skin will itself become diseased if neglected; by the impairment of its important functions it will act as a very frequent inlet, directly and indirectly, to a large class of maladies. The natives of many countries use oils largely to the surface; it may be questioned whether we do not despoil the skin too much of its natural oils by the soaps which Liebig regards as the best tests of civilization in the amount employed. Ablution in cold weather by tepid water, and in warm by cold water should be followed by friction. Soap is necessary to some parts of the body always, to others only occasionally.

Few, if any, of the exciting causes of disease are more frequent or influential than the various *emotions* and *passions* of the mind. They are usually divided by physiologists and pathologists into two classes, the stimulant and sedative; but in this view of the diversity of their agency I cannot coincide. The passions always impel to action; nothing else can be their object or purpose. All emotion, every passion, must therefore be in its own nature stimulating or excitant. All alike spur us to preserve, defend, or enjoy. This is their original and essential effect. They present, however, the obvious analogy with many physical stimulants that in the more intense degrees they overpower, and this instantly, the physical forces; but this happens as well with any one as any other among them. They may be so intense as to transcend the powers of action and endurance, but this is equally true of the pleasurable, which are generally regarded among the stimulant, as it is of the painful, which are considered depressing. Love, for example, the most pleasurable and exciting of all the passions; what say the poets of it, Catullus, Sappho, Moore; the philosophers and pathologists, Montaigne and Copland? of its syncope, impotence, delirium, wasting and decay! Fear, on the contrary, described as emphatically sedative, often we know "gives wings and force." "Fear," says Cogan, "is the most dangerous of the passions;" as indeed we see in the insane impelled by it, and in a cornered rat. Hatred, one of the most painful, is perhaps that which confers the most violent and enduring powers of physical action.

Their direct and immediate operation seems determined upon the nervous centres, the brain, the spinal cord, and the ganglions of the great sympathetic. They affect the circulation in proportion to the sensibility and irritability of the subject. They quicken the motions of the heart; they render tremulous and unsteady the contractions of the voluntary muscles, though they generally increase the vehemence of the contractions.

Anger occasions flushing of the face and redness of the eyes. Broussais tells us that it consists in "a simultaneous irritation of the brain and the epigastric centre." Hence it gives rise to apoplexy, and epilepsy, and paralysis, and to fatal cardiac affections. The author above quoted says he has "seen it productive of both hæmoptysis and severe pneumonia." The effects of violent grief are very similar. I have myself seen apoplexy follow a paroxysm of this passion; hysterical and epileptic convulsions are more common. Joy, when violent, is dangerous by the same pathological influences. During intense joy and profound grief, there is much suffering in the region of the heart, of which the subjects of these emotions speak as "full," "oppressed," and "bursting." Fear is, of all, the most annoying and directly injurious. Tremors, spasms and convulsions are its frequent effects. It augments certain of the excretions and relaxes the sphincters, thus giving rise to micturition and diarrhœa. It arouses the muscles of voluntary motion to forcible action, and endows with immense strength for the defence or flight which it prompts.

Anxiety acts directly upon the great sympathetic, and deranges both secretion and nutrition. Under its influence digestion ceases as if the eighth pair of nerves were cut: and its protraction renders the countenance haggard and emaciates the body. The whole frame has been known to assume in this way the appearance of premature old age. Thus the hair of the beautiful Marie Antoinette became white in a short time. A similar change took place in ten weeks from the same cause, in a patient of Dr. Holland's, and during the distressing and solitary voyage of Madame Condamine down the desolate and fearful Amazon. A surgeon of distinction, one of my friends, assures me that there is a particular lock of hair on his head which grows white whenever he is especially burdened with protracted anxiety, resuming its original color when the emotion has passed away.

Love, though last not least on this brief catalogue, is doubtless the most powerful of human passions, and may rank among the most fruitful causes of disease, even when successful and happy. It is at best a stormy emotion, and knows no tranquillity; but when accompanied by jealousy, its frequent attendant, if not inseparable companion, that mind must be singularly well poised and that frame robust indeed, which can withstand their concussions. Anger has been called by the Latin poet a "brief madness"——; Love is more mad than anger, and unhappily not so brief.

The organs of the senses, the special sensibilities, are inlets of disease under various contingencies, and impressions upon them, either excessive or unadapted, become exciting causes. Sounds too long continued or too loud distract first and soon give pain, originating vertigo, or headache. Sweet music, especially if profoundly pathetic, causes swooning, hysteria, and even epilepsy. Odors often occasion fainting and nausea if too concentrated or inharmoniously mingled. I do not speak of the offensive, which are of themselves often in greater or less degree poisonous, but of the class ranked as "fragrant," agreeable, pleasant to the majority. The relations of color to the psychical health are said to be curious and interesting. Light and positive colors excite, darkness and negative colors depress the mind. Rösch and Esquirol say that indigo-dyers become melancholy; those who dye scarlet, choleric. Paracelsus advises red coral against melancholy, and declares blue injurious and morbidly sedative. Is it hence that we derive the phrase "blue devils" to designate mental dejection?

The habitual use of *narcotics* may be spoken of here. In all tribes of men certain articles have been discovered which exhilarate and brighten the mind in greater or less degree, and aftewards torpify and benumb the sensibilities. For which of these properties they are so much sought after, it is difficult to say. Probably, in their earlier employment, for their cheering influence; and after a while having become first familiar, and then necessary from habit, their anæsthetic or stupefying effect is desired. Suffering, both mental and physical, is the lot of our frail race. Hunger and thirst, cold and fatigue oppress alike the savage and the civilized man. Care and anxiety, fear for the present, and despair of the future, especially annoy the latter. Hence the eager desire for alcohol so instinctive and universal; the not less universal fondness for tobacco; in Asia and Africa, the abandonment to the stupor of opium, the soothing quiet of the betel, and the sensual dreams of Haschich; and, in South America, the less obviously narcotic coca. We may add the recently announced prehension, in Middle Europe, of unsuspected and almost incredible quantities of arsenic, as it would seem, chiefly for similar purposes, though under diversified pretexts. Concerning all these, the same remark holds good, namely, that in small or moderate amounts the employment of these narcotics seems compatible with the enjoyment of at least ordinary health; nay, a very palpable degree of excess does not appear always to shorten life, or to diminish the vigor or bodily activity of the subject. But the tendency of all of them is evil; and, as the condition of the body is continually varying, there must be a constant risk of their affecting the system unexpectedly and severely by an unforeseen unadaptedness. The evils of the intemperate use of alcohol are familiar to all; but it is not sufficiently considered that what is regarded as a moderate use of it in its concentrated form as distilled, must expose the employer, no matter how low his standard, to the perpetual and serious dangers of excess and unadaptedness—conditions ever varying and relative. This remark, though less plainly perceptible in regard to tobacco, is equally true. The nervous system, acted on by it to a given extent, is in no manner constant in its susceptibilities, but liable to be morbidly affected at one moment by an amount which did not before impress it at all unpleasantly or noxiously, and thus a grievous and permanent injury may be inflicted. And so of the rest, which require less notice from us, because, although perhaps not untried or unknown among us, their use is not frequent or extensive.

4. Lastly, the SOCIAL conditions require to be considered. Whether man is naturally a savage or civilized being, it is of little consequence to inquire. I believe that, from the beginning, the various tribes held relatively the same comparative positions as now: some of them domestic and fixed in their habits, and progressive in their desires and purposes; others essentially nomade and unsocial, untamable, and stationary. That the evils of the latter condition predominate, may be fairly inferred from the fact that these essentially wild races are dying out and melting away, and will finally disappear, like the more savage animals and useless reptiles, from the surface of the earth. But we must not imagine that civilization is a clear and unmitigated gain. On the contrary, it has its own peculiar causes of disease to deal with; some of them, original, inherent, and partaken with the savage, have been increased; while others, new and unexpected, have been developed in the very progress upon which we plume ourselves. The average condition of the masses is, doubtless, elevated very greatly; but there is nothing in the very lowest savagism, of comparable degradation to the infamy and suffering which beset, and, as it would seem by an inevitable destiny, the victims of the highest civilization. Contrast, for example, the most miserable and pleasureless life of the Fuegian, the Esquimaux, or the Rocky Mountain Digger, the lowest of nature's denizens, with the existence of the English miner and collier, or the pauper and prostitute of the great European cities. Even

in our new world the contrast is already prodigiously great. In some of the streets of Boston, and of New York, the average duration of life is fully double that of the dwellers in neighborhoods of quite close proximity. Indeed, it may be affirmed with substantial truth, that in certain purlieus of the dense metropolitan towns of both hemispheres, the artificial causes of disease, created or augmented by the conventionalities of social forms of existence, so abound and prevail, that disease in its protean diversity is universal: and that not one human being, born and brought up within those limits, can hope to enjoy either physical or moral health.

Of the habits and customs of civilized life, those which traverse the settled harmonies of nature, by an obstinate and reckless opposition or contrast, are most harmful. The tendency to turn night into day does not suit an animal whose nature is not nocturnal, and whose pleasures, as well as his duties, should be followed by sunshine chiefly. Fashion commences her reunions everywhere just when we ought to go to repose. Our eyes are irritated by artificial and impure light: our nerves fretted and exhausted by untimely and protracted excitement; our minds kept awake and alert, when they should be enjoying the restorative influences of inaction and rest. The delightful and tonic exhilaration of the morning air, the purest, and coolest, and most transparent condition of the atmosphere at sunrise, are entirely lost or unknown. Our lungs are oppressed by the foul atmosphere of crowded, heated, and lighted rooms; and our vital circulating fluid correspondingly vitiated. These excesses may be long borne with apparent impunity; but some unfortunate moment finds the system in a state unadapted to bear even what it has grown habituated to, and it sinks unresistingly under the infliction. Death soon follows; or, what is worse, some cruel malady of chronic torture and tenacity ensues, and leads to a slower extinction.

The *occupations* followed in civilized society, and rendered necessary by our artificial wants and luxurious refinements, must not be omitted here. The division of labor which is called for, and results from the demand for exquisite perfection and prompt production, is followed by two evils, monotony of life, and the exclusive use of certain organs, muscles, and parts of the body, which unduly determines to and disproportionately develops those parts at the expense of the rest. Hence, there is a loss of symmetry in the external configuration of the body. The oarsman has a full chest with muscular arms, but ill-shaped and unsightly lower limbs, upon which he walks badly. The dancer, on the other hand, exhibits large calves and buttocks, with a weak and slender arm. Some modes of employment improve the condition of the organ, while others deteriorate it. Thus the sailor accustomed to the spyglass enjoys a keen and good sight; while the goldsmith and watchmaker become victims of near-sightedness, dimness of vision and ophthalmia. Mechanical irritations are to be noticed, and the results of vehement muscular action. Hernial protrusions are frequent in those who pare the soil for burning. The miller, stonecutter, and needle-grinder suffer bronchial and pulmonary irritation brought on by the small particles of mineral, metallic, and chaffy substances which they inhale with the air they breathe. Coal miners and heavers exhibit not rarely after death masses of black dust impacted in the lungs. Bakers by kneading the fermented dough, bring on an obstinate cutaneous eruption on the hands and wrist, the "baker's itch." Chimney-sweeps escape only by particular care the foul and intractable "cancer scroti" brought on by the soot lodging in the rugæ of the scrotum. In manufactories generally, the imprisonment for so many tedious hours, the confined air, the constrained posture, and though mentioned last not least in importance, the wearisome monotony of continuous and unchanging toil, weaken the constitution, depress the powers of vitality, and shorten the existence of the operative. What spring of life can there be found in the bosom of him who knows that all his days are to be spent in polishing a button or sharpening the end of a pin? Of all occupations, it may readily be conceded, that agricultural pursuits are most friendly to physical well-being. The labors of the farmer, though regular, are sufficiently diversified, while they are free from the listlessness which is apt to follow desultory exertions; though active and vigorous, they are not so urgent or continuous as to fatigue necessarily or exhaust the strength. Nor do they involve in general any very unpleasant or injurious exposure. When the fields are covered with snow, and the streams are ice bound; when the soil is hardened by frost, when the cold winds whistle and the wintry storm blows loud, he shelters himself within doors, engaged in such labor as may be done under a roof, or suspends all toil for a time. When spring unbinds the fountain and thaws the frost and snow, and loosens the solid earth, he breaks up the clods with his plough and harrow, and sows and plants with cheerfulness and hope. During the heats of summer, he may divide his time so as to avoid the noontide glare of the sun, and pass the sultriest hour in the shade; the mornings and evenings of the lengthened day being sufficient for his out-door work. The declining and mellow autumn calls him again into the field to gather the fruits of his labor in the glad harvest home, after which he again prepares and enriches the soil. Such is the charming picture of agricultural life given us by the poets and rustic writers of England, and applicable as well to the eastern, middle, and northwestern States of this continent. Far different, however, is the planter's life of our south and southwestern territory. He cannot, without much risk, even reside upon his most fertile lands. Its exhalations are fatal to the race who possess it, and who must cultivate and improve it by means of the labor of another race. Let it never be forgotten, that each of the varieties into which the human species has been divided, was originally provided with its special and appropriate dwelling-place or district, which, if it desert and intrude into that allotted for either of the others, it must pay a grievous penalty. I will not pretend that these limits are clearly laid down, or accurately defined in every case, but nothing can be plainer or more obvious as a general truth. The Englishman lives, moves, and has his being in tawny Hindostan, by the labor of the native of that sultry land. The white man must die if he take up his abode in the neighborhood of the Niger, or among the swamps and islands of

Africa, or along her steaming plains. Nor can even the mulatto, it would seem, long survive the ravages of a climate hostile to the slightest tinge of Caucasian blood.

The latitude and locality which we now occupy, was wrested by conquest from the red Indian, who seems in all his distinctive characteristics to have been singularly well adapted to the temperature, and soil, and circumstances. It is the fit home of neither the white, nor the black man, its present residents. In winter, it is too cold for the African, in summer too hot for the European. The malaria of the swamps to which the Seminole and Yemassee were almost insensible, is equally innoxious to the negro; but the red man can endure the frost and snow, enemies before which the nations of black men would perish from the face of the earth. These, then, so necessary to us in summer, require from us special protection in winter. If not warmly clad and exempted from protracted exposure in severe weather, they die of pneumonia, rheumatism, and similar morbid effects of cold. They must be prevented, too, such is their dread of the invasion of the piercing winter air, from so effectually shutting out all ventilation as to poison themselves into typhus.

Mechanical occupations are most obviously divided, in their hygienic relations, into the active and sedentary. The first class may again be subdivided into the sheltered and exposed; sedentary pursuits are almost universally carried on under shelter. A third class may be referred to as being subjected to specific agencies of a poisonous nature—as glaziers and plumbers, painters, printers, gilders; but these are to be spoken of under another head.

The best chances of health and longevity are clearly to be found among those who pursue active occupations under shelter, such as blacksmiths, tinners, wheelwrights, tanners, butchers, cabinet-makers. The tanner has been in all countries supposed to enjoy a special exemption from disease, and the vulgar think that there must be something particularly salubrious in the odors, gases, and other agents by which the leather-maker and dresser is surrounded. It has been indeed distinctly asserted that consumption never attacks these mechanics; in which immunity butchers also partake, and ropemakers and those engaged in dockyards and elsewhere in handling tar and pitch. I will not deny that these are very wholesome trades; but I have myself known more than one instance of phthisis among tanners, and have also seen the disease in a ropemaker. The whole secret lies in the concurrence of the two conditions of shelter and activity. The carpenter is also apt to be healthy if he avoids, by work within doors, the extremes of heat and cold. The mason is liable to many injurious influences which affect him variously. Lime dust, and particles of stone offend his eyes and lungs, and he cannot avoid occasional hard exposure and violent exertion.

I have said that we of the white race are intruders here. It is in summer and autumn that we are made painfully sensible of this fact. In order to ascertain the degree of heat to which unsheltered mechanics and other laborers are subjected in these seasons, I have made numerous experiments. I shall not give here the details; but the result is that for three or four hours in our warm days, the general temperature in the open sunshine will not be less than 110 or 115 when the thermometer stands in the shade at 85° to 90°. It is not necessary to repeat what was said of the direct and indirect effects of heat, to indicate the serious risks of such exposure.

The liabilities to disease of mechanics engaged in sedentary and of course sheltered occupations, will be of very opposite character. The saddler, the shoemaker, the tailor, the goldsmith suffer from want of exercise in the first place. There is an incidental but unavoidable seclusion too from fresh and free air, which is of course enhanced in winter, by the necessity of employing artificial heat in a close apartment.

This demand is indeed a most unfortunate necessity presented in all such examples, for supplying which, no mode free from objection is likely to be employed in workshops. A cheerful fire kept blazing in an open chimney, so much to be preferred on many accounts, is too expensive, too variable, and too unequal in its distribution of comfort. A stove dries the atmosphere of the apartment, and consumes its oxygen more rapidly than moisture and air are supplied by its imperfect ventilation; it burns the floating atoms of vegetable and animal matter which come in contact with its surface, and thus vitiates the air and renders it offensive. Besides this, a passive subjection to elevated temperature renders us extremely liable to the risks of any alternation. To advert more fully to the evils peculiar to each of these sedentary occupations, would lead me into too much detail. Suffice it to say, that they consist in too great use of some, and too little of other parts and organs of the body, which we should employ in equable or proper proportion, and none of which will bear to be too violently or unremittingly exercised. Or they depend on, and are attributable to, the influence of improper or constrained positions. Those who sit constantly, develop imperfectly the muscles of the lower limbs. If they bend forward, they compress the abdomen and flatten the chest, disturbing the functions of the viscera contained in both these cavities. The goldsmith and watchmaker add to these the injurious tendencies of the fumes of charcoal, and other combustibles and fluxes; the dimness and irritability of the eyes, resulting from exposure to strong light and attention to minute objects, and the disturbance of both respiration and circulation attendant on the use of the blowpipe.

Lastly, we mention the literary laborer, the student, who can scarcely avoid deterioration of health from his pursuits. His frame is attenuated by defective nutrition and imperfect muscular development, the inevitable result of defect of exercise in the open air; his thorax is contracted and oppressed by the bent posture which brings his dim eyes near his books and papers, and allows him to support his feeble body against his desk or table. Incessant mental effort determines disproportionately to his brain; he becomes the ready victim of some of the various types of cerebral disease, and the long list of maladies which ensue from deficient development of the organs; and he lives a martyr to nervous ailments or dyspepsia, or dies prematurely under the gradual wasting and sure decay of pulmonary consumption.

SPECIFIC CAUSES: POISONS.

There are, in the several kingdoms of nature, many substances or agents, whose peculiar qualities render them discordant with the normal and healthy condition of the human body, when brought into contact with, and allowed to exert any efficient action upon it. These we call *poisons*. The degree of injury which they are capable of inflicting varies in each, from a transient and slight disturbance, to the mortal prostration of vital power, or fatal organic lesion. The force with which each shall act, depends upon, or is liable to be modified by certain contingencies, such as the condition of the recipient, the amount of dose, the protraction of its application. But these circumstances do not affect or change, in any notable manner, the nature or kind of influence to be expected. The character of this influence is definite and uniform.

Under this general head, it is obvious we must include the long catalogue of drugs or medicines, which all, if efficient in the production of any impression upon the system, derange some of its functions. As, therefore, all medicines are in this sense poisons, so certain therapeutical experimenters, with the celebrated Baron Stoerk at their head, have been disposed to regard all poisons as medicines; and their speculation has been fruitful of some valuable results in the addition to our *apparatus medicaminum* of several important remedies, of which prussic acid and strychnine are examples. But the rule thus proposed is liable to a wide range of exceptions.

Poisons are usually divided, according to the kingdoms of nature in which they have their origin, into *vegetable*, *mineral*, and *animal*. To these I will add a fourth class, the *aerial*, which comprehends many impressive, familiar, and extensively influential agents, not to be arranged properly or with precision under either of the preceding heads.

1. The VEGETABLE POISONS are numerous. Some few of them appear to throw out noxious exhalations, and reach the subject at some distance, though this is doubtful. It is asserted of the upas and mancinella, that if applied directly to the skin, they irritate severely. The rhus radicans, rhus vernix, cashew nut, mannarilla, cerbera ahovai, mustard, pepper, horseradish, croton tiglium, inflame the surface when laid upon it, though with very different degrees of violence. Some require to be introduced into the circulation through a wound or abrasion of the cuticle. It is in this way that the terrible effects of the woorara, ticunas, and other South American poisons are obtained, and thus the weapons of some savage tribes are rendered deadly. But a still greater number of vegetable substances act upon and through the medium of the mucous membrane lining the digestive tube. These are our emetics, purgatives, narcotics, &c., which are designated by titles serving to point out the modes in which they disorder the system. Their direct and indirect effects are supposed to be accounted for partly by a local irritation of the surface to which they are applied, partly by a sym-

pathetic influence extended through the nerves of that surface to distant tissues and organs, and partly by their absorption into the mass of circulating fluids, and their being carried to the parts and organs upon which their peculiar qualities and specific affinities fit them to act.

Some of them are on the doubtful line which separates the materia medica from the materia alimentaria, as the mushroom in its several varieties. The mandioc of Brazil contains a nutritious farina, with a noxious juice, which is got rid of by careful manipulation, leaving the former a safe and familiar article of diet for thousands. Concentration alone is necessary to render deadly the pleasant flavor of the almond and peach kernel, which afford, in the laboratory of the chemist, the fatal hydrocyanic acid.

Many of the vegetable poisons are in constant use among the luxuries of civilization. What would the human race be without tobacco, which an universal instinct everywhere craves greedily? There is scarcely a more fearful poison than the alkaloid narcotin, extracted from it. Its oil is a most pernicious, nauseating, acrid agent. Some, nay a great many individuals cannot bear its use in any form. On the other hand, it would seem that there are tribes of men who can even eat the detestable vegetable with impunity. Wilkes tells us of the natives of the Ellice's and Kingsmill group of Polynesia, that "they eat and swallow it with a zest and pleasure truly disgusting and indescribable. Their whole mind seems bent upon obtaining this luxury." That it is not fatal to them must be owing to some tribal peculiarity.

In tobacco manufactories, the workmen all look sallow and ill; but it seems that they become accustomed to the fumes and inhaled powder; for I cannot learn upon inquiry that they are subject to serious disease; and such also is the conclusion arrived at, in the report of a French Commission appointed to examine the subject. Yet we see many instances of the evil effects of the article in our country, where it is used more excessively and in greater variety of modes than elsewhere. Smoking and snuffing are common both in the new and in the old world; but it is only in the United States that chewing is a habit of civilized life, extending itself even among refined gentlemen. The mischief done is not, perhaps, as obvious or direct as might be anticipated; but there cannot be a question that much of the impairment of digestive power and of animal vigor secretly felt, and of the integrity of the nervous system, so often complained of, must be ascribed to these unfortunate national customs.

The manufacturers of cinchona, now so important an article of commerce, suffer some peculiar morbid effects from their necessary exposure in handling and inhaling it. Among the maladies thus produced, Riviere mentions "an eruption which follows the prolonged contact with the aqueous or alcoholic solution of quinquina. This affection presents itself sometimes under the form of an exanthem, and at other times assumes a pustulous character." M. Zimmer, manufacturer of sulph. quina, at Frankfort, tells us that "the dust of quinquina sometimes produces a true attack of intermittent fever, with its periods of heat and cold. Those who have been thus attacked once, undergo similar exposure afterwards with impunity." M. Chevalier suggests, in a report on this subject to the French Academy, the experiment of inoculation with the pustule of "cinchona disease," above spoken of, in the hope that such inoculation, if successful, will protect not only against "cinchona fever," but against the intermittent and other maladies of which cinchona is the specific remedy and prophylactic.

2. The list of MINERAL POISONS is not long, if we refer only to those which nature offers us; but the researches of chemistry have added prodigiously to the class, by her combinations and decompositions. The pure earths, as they are called, and the alkalies are caustic and corrosive; so are the mineral acids generally. The metals are for the most part inert, until, by the action of air or some acid, they are converted into oxides or salts; all of which are capable of doing injury, and many of them rank among our most serviceable medicines. Mercury and arsenic are volatile, and their fumes are highly poisonous. In the quicksilver mines, the workmen are considered victims, whose places, almost annually rendered vacant by death, must be filled by new victims. Criminals are often employed in this way, and so expiate the guilt of murder, treason, and sacrilege. Amongst the familiar effects of mercury, is its action upon the salivary glands and the gums, alveolar processes and the bony tissues, giving rise to ulceration, caries, necrosis and sphacelus. We see these effects sometimes in medical practice unfortunately; not unfrequently in the artisans who work in mercurials, such as gilders and looking-glass makers.

A remarkable example of these deleterious influences we have recorded in the history of the British seventy-four ship Triumph, which, having captured a Spanish galleon loaded with boxes containing bladders of quicksilver, had the hold filled with this dangerous cargo. The bladders having decayed or being destroyed, the metal escaped and its fumes pervaded the ship. Everybody on board was more or less salivated; some lost teeth, and some a portion of the alveoli. Even the animals kept in the ship suffered similarly.

Arsenic, unhappily well suited to the designs of evil, from the minuteness of the fatal dose, and the easy disguise of which it is susceptible, excites an uncontrollable gastritis. Yet we learn from Tschudi, that the preparations of arsenic are habitually taken in poisonous quantities by certain persons in Middle Europe for various purposes, and not only like tobacco, with impunity, but, as they allege, with advantage; improving the complexion, fattening the body, and increasing the respiratory powers. In one manufactory, it is in use by the workmen, in pretty large doses, as a prophylactic against the evil effects of exposure to its fumes.

Lead is a very destructive agent when taken into the system in certain modes. Those who are engaged in making the preparations employed largely in the arts, are almost sure to suffer. It deranges both the digestive and nervous systems grievously. Painters are so liable to these evils that rachialgia, or painters' colic, has thus obtained its title. Many of our beverages contain, it is said, injurious quantities of lead; cider, gin, soda water, and even fountain water, carried through lead tubes, are all accused of producing disease. Nay, the exhalations of newly-painted rooms and from the clothes of house-painters, have been charged with the same effects. I cannot help believing that, with some truth, there is a great deal of exaggeration in these statements.

Zinc has been urgently proposed as a substitute for lead in the arts, on account of these alleged qualities, and it cannot be doubted that it is much less deleterious, though it is not entirely free from similar imputations. From Landouzy and Maumênè, of Rheims, we learn that "iron wire, formerly employed to fasten champagne corks, having been replaced in 1850 by wire called galvanized, *i. e.*, covered with oxide and carbonate of zinc, the workmen, previously healthy, soon complained of serious symptoms—not very dissimilar to those of lead poisoning, headache, nausea, colic, constipation, tenesmus, or diarrhœa, sore throat, ptyalism, &c."

Copper is well known as an acrid poison in union with certain acids. Antimony, by its peculiar properties, ranks high in our materia medica; yet it is always to be employed with prudent reserve. It not only occasions, as is well known, vomiting and purging and cramps, but is capable of acting as a direct sedative, fatally oppressing the powers of vitality. I will add here, by way of caution, that there is scarcely a salt prepared in the chemical laboratories from the great treasury of mineral and vegetable nature, that may not, in given quantity, exert a dangerous power over the body. Thus, the pleasant supertart. of potass—the sulphate of potass—the similar preparations of soda and of the two combined, are all accused, and as I believe on good grounds, of most grave and unexpected ill effects, when employed thoughtlessly or too confidently. I may add, in this connection, anticipating the notice of an article properly belonging under our next head, that we owe also to the genius of chemistry and the progress of civilization, a new and terrible mode of poisoning, in the use made of phosphorus in the arts. In the manufactories of the phosphorus matches, so universally employed, so great a convenience, nay, now so absolute a necessity, the workmen are known to be liable to a most unmanageable form of inflammation, ulceration, and sloughing of the gums and cheeks, with caries and necrosis of the bones of the face.

3. The ANIMAL POISONS are divisible into four classes:—

1. Those which result from the natural and healthy actions in certain creatures, are intended for attack and defence, and essential to their conditions of existence. These are the venom of serpents, the sting of the bee, ant, wasp, hornet, gnat, &c. All of them seem to be of acid quality and depressing character when introduced largely into the system, though locally irritating. They are affirmed to be neutralized by mixture with alkalies, and counteracted by alcoholic stimulants. They may be safely taken into the stomach, as experimenters have proved, either undergoing digestion, or like some of the vegetable irritants, refusing to affect the mucous, though prompt to inflame the cutaneous tissue. One curious example, in which all parts of the animal seem acrid and poisonous, and apt to derange all the human tissues and surfaces, is found in the cantharis, or Spanish fly.

2. Certain natural and normal secretions undergo a morbid change, and become poisonous under the influence of disease or other agencies. The milk of a diseased cow is known to be, under certain circumstances, highly deleterious to health. There must be some foundation for the general belief in this fact in our southern and southwestern regions, whatever may be the final result arrived at in the discussions so long continued, as to the existence of the specific disease entitled milk-sick, of which I shall speak in the proper place. The calf of such a cow is poisoned: so is every one who partakes of the milk, or of the butter or cheese made from it. I lay no stress on the stories told us of immediately acrid and injurious qualities generated in the milk of an enraged or frightened nurse; yet it seems reasonable to believe that the protraction of these mental states of violent perturbation will affect the secretions. I suppose we may consider it established as to the saliva. Wright has collected many statements which go to prove this. Hoffman mentions several instances of the bad effects of bites from irritated persons, and one from his own observation, of death from the bite of a man in a state of high nervous excitement. Pouteau gives the case of a man who went mad from the bite of an enraged person. Manject says that a man, in the delirium of fever, bit another who shortly after became rabid. Malpighi tells us that his mother died mad through a bite from one of her own children, in a fit of epilepsy. Strangest of all, a case is recorded in the *Dict. des Sciences Médicales* (Art. "Rage"), of a man who died mad in consequence of having bitten one of his own fingers while in a violent passion.

In Dunn's account of the Oregon Indians, we have a curious and interesting picture of the return of one of their chiefs from the fanatical seclusion in the forest, whither they occasionally retire to seek "direct intercourse with the great spirit." He is a ferocious demoniac; the most hideous object in nature, with matted hair, shrunken cheeks, bloodshot eyes, and parched lips. Entering at will, furiously and wildly any house, plunging down through the roof, he springs on one of the full grown inmates like a famished wolf, and wrenches with his teeth a mouthful of flesh from his limbs or body." "Wounds thus received are regarded as honorable and sacred: and often prove mortal. They present a most hideous appearance and the fetor issuing from them was most noxious," as was also that of the breath of the chief, even after his recovery. Something analogous seems to present itself in the fact that the lama of South America, when angry, ejects from its nostrils an acrid mucus which inflames severely all the parts which it touches. This seems the only defence with which nature has provided this feeble and humble but useful creature.

Nothing is better known than the fatal poisoning of the saliva of a hydrophobic animal; in this secretion resides the whole, so far as we know, of the contagious *materies morbi*, which, in certain classes of animals, may thus be transmitted through an indefinite series, by inoculation with the teeth, or, as in experiments made for the purpose, with the lancet. It is not alleged or imagined that this salivary inquination takes place in man.

3. The processes which immediately precede, and those which ac-

company or follow death, sometimes generate a poisonous quality in animal matter. Hence, the almost universal avoidance, unless where there is scarcity of food and a degree of famine, of the flesh of animals dying of disease; and this is reasonable. But the tendency or result is not uniform; nay, we are assured it is far from being general. Delafond, professor at the great French Veterinary Institution, maintains that such flesh is innocuous, with a single exception, "epizootics of the nature of malignant pustule—the charbonneux;" which, he says, should be prohibited under severe penalties from being offered as food. There is, in our country, another exception, that of animals dying of the mysterious disease already alluded to, the "milk-sick," which is undoubtedly injurious not only to man, but to the lower animals who partake of it. The "peste bovine," or contagious typhus of cattle, which has made such ravages in the North of Europe, was supposed to communicate injurious properties to the flesh of such creatures as died of it; but its harmlessness as food has been demonstrated by an imposing heap of facts collected in Italy, Holland, and France, by Ramazzini, Camper, Huzard, Mercet, &c. A committee of the Belgian Academy of Medicine reported in favor of the innocuousness of meats procured from sick animals generally; and Delafond records the particular negation of evil effects in pleurisy, peripneumonia, paralysis, diseases of the bones, aphthous fever, and several others named. The pupils at Alford, with the professor himself, have often made use of "the meagre flesh of cows dead of pulmonary phthisis without repugnance or inconvenience." It is undoubtedly proved that these meats are not uniformly noxious, but there are numerous exceptions. We sometimes see around a dead carcass, even carrion birds and dogs lying poisoned. Cases are frequently recorded of poisoning by such food, and although epicures prefer their game high, as they term it, rendered brittle and soft by incipient decomposition, yet some anomalous change sometimes makes it poisonous. I have seen a whole family of boarders made very ill by gastric inflammation following the use of soup, warmed up and brought to the table several days in succession. German sausages occasionally give rise to incurable disease, with great suffering and fatal atrophy. They are compounded of blood and brains, liver, bacon, milk, flour, and bread, thrust with salt and spice into a bladder or intestine, then boiled and finally smoked. When this last drying process is not properly complete, the sausages ferment and grow soft and pale in the middle. "Those who eat them in this state suffer a horrid sensation of drying up; they waste away, the saliva is viscous, and fatal tabes ensues."

The northern partridge, or ruffed grouse, *tetrao umbellus*, becomes occasionally poisonous. Bigelow has collected several instances of serious injury done by it when eaten. The morbid influence has been directed upon the brain primarily, and then on the digestive and circulatory systems, as a sedative chiefly. He rejects the prevalent notion that these effects are owing to the food which the bird has eaten, and suggests rather that the bird is laboring under disease; and that its flesh, when long kept in cold weather, may undergo some slow and deleterious chemical change, not putrefaction. This very season (1854

-55), the oysters along our coast have been accused of having become irritating and dangerous diet, and of giving rise to several attacks of fatal cholera.

In the dissecting room a very obscure risk is incurred by inoculating the fingers with the foul and festering fluids of the decaying cadaver. Hundreds of wounds may thus be received without injury, although, it is true, they are all apt to heal slowly and reluctantly; but, at last, a slight puncture or abrasion, made while using the knife upon the most harmless-looking "subject," may be followed by severe local inflammation, extending up the arm along the course of the absorbents, swelling and abscess of the glands, universal inquination of the humors, sore-throat, dark maculous eruptions, prostration, and death.

Dr. Fullerton tells us that, in Australia, sheep, horses, and cows, are liable to a fatal distemper, which, among them, is "infectious, but communicable to the human race only by inoculation." A wound received in skinning, or otherwise operating on the carcass of such animals, is productive of an unhealthy sore, of peculiar blue aspect, "followed by extended inflammation along the absorbents, vesication, and ulceration. Fever then sets in, and soon prostrates the sufferer." He gives an instance of a lady inoculating herself by kissing the corpse of her son-in-law, dead of the disease, her lips being slightly abraded. She recovered; but, a second patient having died from inoculation in skinning a diseased cow, he assisted a medical friend in examining the body. "Neither of us wounded ourselves. We were careful to use free ablutions; yet a pricking and heated sensation in my hands and arms interrupted sleep during that night, and was followed by a feeling of discomfort and want of appetite for a week afterwards. My companion was similarly affected."

4. Diseased bodies and surfaces occasionally, and in particular and well-known examples uniformly, generate and give out a peculiar matter—a new production of varying form—which possesses the specific power or quality of generating in a healthy body upon which it acts, a diseased condition similar to that whence it derived its origin. Such diseases are called *contagious*, and constitute a most interesting class of maladies.

CONTAGION is a word used, unfortunately, in two senses, both as the specific morbid matter, and as the mode or act of communication. This is owing to a defect in our language, which has no verb allied to the noun "contagion;" and thus we have been driven to a promiscuous employment of the verb "infect," and the noun "infection," which has occasioned confusion and error in our discussions. To avoid all these difficulties, it would be well to follow W. Phillip in the distinction he proposes, and confine the application of the word *contagion* to denote the morbid poison; while *infect*, *infecting*, and *infection* shall signify the act and mode of communication. The adjectives "contagious" and "infectious" are often employed to express modes of action definitely contra-distinguished; infectious conveying the idea of impregnation of the atmosphere, and poisoning a healthy body through and by means of it; while "contagious" is set apart to denote a more limited influence, requiring inoculation, or, at least, actual and palpable contact.

But it is impossible to preserve these distinctions. Many contagions diffuse themselves, or undergo solution in the air; and many offer no visible or tangible matter for palpable contact.

The matter of contagion may exist either in a palpable or impalpable form. Of *palpable contagion*, we have examples in the virus of variola and vaccine, gonorrhœa, and syphilis. We can insert efficiently the fluid matter secreted in these diseases, or inoculate. Of *impalpable contagion*, we infer the existence, logically, demonstratively, inevitably, in certain instances, in which we have detected no palpable or distinct secretion, as in typhus, scarlatina, pertussis. We observe that some contagions are efficient at a certain distance from the source, besides being communicable by inoculation, or touch, or near approach, as smallpox, measles, plague; and we conclude here that the contagion is soluble or diffusible in the air; or that an impalpable exhalation, as well as a palpable secretion, is given forth.

It is curious to observe that the effects produced by any form of contagion are in no degree influenced or modified by the quantity of the virus efficiently applied, as indeed it must often be inconceivably small. By extreme dilution we may destroy its infecting force, but it is out of our power to graduate its influence. Such is certainly the fact with the palpable contagions. If we inoculate any one with the minutest atom of variolous or vaccine matter, he will be affected, if affected at all, with just as virulent and severe disease as if we insert the greatest amount possible. This was formerly made the basis of a distinction between a *virus* and a *poison;* the latter depending for its effects, in manner and degree, upon dose or quantity. The independence, on the other hand, of a contagious virus upon the amount applied, has been supposed to afford ground for the belief in a contamination of the entire fluids of the infected body—a progressive and universal series of change and morbid assimilation. A word has been coined to express this characteristic property of certain diseases by the Registrar-General of England, and is employed in his annual reports—zymotic—the etymology of which implies a leaning to the opinion, by no means a novel one, that the phenomena are attributable to something like fermentation in the blood and other fluids. The term has now come into general use, though it is somewhat loosely applied, including some endemics of which we cannot affirm the analogy, and excluding many contagions, all indeed that are not febrile.

We are now prepared to point out two elements essential to the description of contagion as a cause of disease; first, that it should be *germinal*—that is, self-multiplying, reproductive; and second, that this reproduction should depend upon, or be favored by, the very *processes of disease* which itself gives rise to.

In the present state of our knowledge of the history of contagion, we cannot venture to declare it to be the exclusive source of contagious diseases. All such diseases must once have had a beginning independently of such cause; the very existence of which is, in the nature of things, secondary and derivative. Nay, some contagious diseases begin now-a-days under our own eyes spontaneously, or without perceptible connection with any source of contagious matter; as typhus, which none will deny to be generated by low living, and filth, and crowding, and want of ventilation; ophthalmia, developed by a certain concurrence of circumstances in Egypt often or constantly, and elsewhere occasionally; plague, a denizen of the same region; puerperal fever, which shows itself here and there and at different times among parturient women, and yellow fever, asserted to be indigenous in some American cities and on the coast of Africa. Smallpox appeared in Europe first at the commencement of the Mahomedan era; now and then it breaks out in remote and secluded places most unaccountably, and without any perceptible connection with previous cases. Thus it attacked two individuals, at different times, who had been secluded many months in the Eastern Penitentiary of Pennsylvania. Thus it appeared, as described by Dr. Banks, in a remote village in Indiana. Thus it seized, under my own observation, a runaway slave from a plantation in the interior of South Carolina, who had been caught in the woods and imprisoned in the Charleston Workhouse; no instance of the disease having been known in the city or State for months or years previously; none certainly having existed within the limits of the institution in which he was confined. Every practitioner meets with similar examples of contagious diseases thus obscurely and apparently spontaneously springing up. No one imagines it possible to account distinctly for the instances of measles, scarlatina, and pertussis, that occasionally present themselves in this insulated way. Each of these, however, is likely to be the centre from which shall radiate new cases in every direction; and, as each contains in itself the cause of other similar cases, this must be reproduced and generated in an unending series. Hence we draw the inevitable inference of its organic character, its vital condition.

Nothing inorganic or inanimate can propagate itself, and the facts that go to 'prove the germinal force of contagion are clear, abundant, and familiar. An atom of variolous matter being introduced under the cuticle of a healthy subject shall, in a definite process of time, effect such changes that the whole surface shall be covered with pustules filled with just such matter. A drop of blood from a scarlatinous patient being in like manner introduced into the vessels of a sound person, the whole blood of the latter will become in a few days tainted with a poison, capable of spreading the disease all around him. The matter of contagion then must be living matter; must be organized, however obscurely or imperfectly; and in whatever mode or form, whether simply cellular or of more complicated structure, whether a sporule or animalcular, its capacity of self-multiplication, of indefinite reproduction, constitutes its essential characteristic.

But our definition implies also another point of much interest. The organisms in which resides this property of reproduction, must, in order to come under our consideration as contagious, possess a decided affinity for the animal constitution—nay, the human constitution properly, for our subject is *human*, not general animal, or comparative pathology. It is doubtful, for example, whether hydrophobia is contagious, for we know not yet that the animal poison which produces it, and which we receive by inoculation from the feline and canine tribes, is reproduced in the bitten man. A like doubt exists as to the poison of glanders, by which a diseased horse fatally infects his healthy groom. We know that the poison of vaccine is thus reproduced. It is a nice distinction that has not until recently been attended to, but now receives proper notice in every case, and we ask whether, even when we know that a disease is transportable—we ask whether the true *materies morbi* is organic, and if so, whether it has its nidus or habitat within the body, and there germinates and multiplies itself.

In no case have we clearly set apart and distinctly apprehended the mysterious atom of contagious matter. Yet our failure to detect it has not arisen from want of close examination and repeated experiment. Nor has there been any defect of confident though premature exultation at the supposed discovery. Berres, for example, gives us the exact dimensions of the fixed contagions; moist contagious matter being "a vesicle of $\frac{1}{3000}$ of an inch in diameter, the dry being in the shape of scales, scurf, or abrasions, an aggregation of semi-transparent, grayish white globules, $\frac{1}{10000}$ of an inch in diameter." But if we reflect that the atom containing the contagious power is diffused in certain cases in the blood, invisibly, as well as mingled with the limpid fluid of a transparent vesicle, and combined with opaque pus; resident in dried scabs and absorbed into various substances, as we shall see, as well as radiated through the atmosphere in an invisible and impalpable condition, we shall scarcely venture to conclude that we have found it, or insulated it in any case. The chemical analysis of pus, and lymph, and ichor, which contain it, has shown nothing peculiar—nothing which does not go to constitute ichor, lymph, and pus, not contagious. Even smallpox matter, according to Lassaigne, differs from other pus perceptibly, in the proportion of its saline ingredients only.

Nor is there anything yet discovered in the form or appearance of contagious matter that can be regarded as characteristic. Under the highest powers of the microscope, the secret is yet profoundly hidden from our eyes. It is even now matter of dispute whether a malignant or cancerous tumor of full growth and development can be thus diagnosed. We sometimes see a fungous vegetation, and sometimes a parasitic animalcule; but it is very far from being settled whether the visible presence of these creations is anything beyond a mere result or effect of previous disease. We thus indeed introduce a new element of confusion into our descriptions. If we admit, as some do, the dependence of psora upon the itch insect, and call psora a contagious disease, how shall we evade the claim of the morbus pediculosis to be also so regarded, or the whole series of verminous disorders depending upon the presence of tænia, ascarides, and the like?

The peculiar nature of such associate and dependent vitality is as yet totally undefined. How are we to designate separate existence, to distinguish a true and absolute individuality? Vogel declares the question "What are parasites?" is not ripe for decision. We shall examine it more particularly in another place. At present, let it suffice to say, that whatever be the exact character of a cell or vesicle, whether animal or vegetable, whether an independent vitalism or what Klencke has called a "semi-individuality," if it be never found but in the animal body; if it be always found in connection with and coincident to some special form of disease; and if such disease be generated upon the introduction of such a cell or vesicle, or whatever form of matter, into a healthy organism in any large proportion of instances, and never or very rarely otherwise, then such cell, vesicle, or other matter is a contagion; it contains within it the specific *materies morbi*. And so of animalculi and fungi; if found only in the animal body; if uniformly coincident with special diseases, which cannot or do not exist without their presence, and follow them when transferred—they are to all intents and purposes, in the present state of our knowledge, indeed virtually the *materies morbi*. It is Liebig's idea that, in examples of successful inoculation, a sort of fermentation takes place in the fluids of the system. The analogy, however, is only a general one. Each instance is peculiar, separate, distinct. In every contagious morbid poison, some new and peculiar result has followed the combination of the elements which go to constitute it, which the highest magnifying powers of our microscopes have not hitherto shown us, nor our nicest chemical analysis prevailed to detect, any more than they have apprehended or made manifest the odorous particles of musk or of the rose.

If this be true of the fixed and palpable contagions, what shall we say of the tenuity of those which are denoted as impalpable; which offer to us nothing tangible, but confound us by their invisible potency and evade all our means of circumscription and limitation. Variola, as everybody knows, is not only conveyed from a diseased to a healthy body by the insertion into a wound of lymph, or pus, or dried matter from a vesicle, but is efficiently active *at a distance*—a healthy body being infected in the neighborhood of a diseased one. Now we must ascribe the phenomena here, either to the radiation and diffusion of the same *materies morbi* which is contained in the scab, pus, or lymph, and which, mingled with the blood of the mother, sometimes infects the fœtus in utero after passing through the placental tissues; or we must assume the production and elimination of two forms of efficient contagious matter, the one fixed and the other volatile. But the first is already shown to be ultra-microscopic in the minuteness of the atoms in which it consists, and therefore I see no difficulty in its elimination and radiation from the diseased body. Minute particles from odorous bodies fill the air around with fragrance or noisomeness. It is relevant to observe here that this remote infection does not occur in any instance in which a visible parasite, whether animalcular or fungous, has been detected; it is certainly chiefly confined to the febrile class of contagious diseases, and probably belongs exclusively to that class. None of the non-febrile contagions are impalpable or diffusible in the air; all require contact.

One great obstacle in the progress of our inquiry here is the uncertainty how far it is safe to permit ourselves to be led by analogy. In some diseases we find only a palpable contagious matter; others show, *besides*, an impalpable or diffusible contagion, effective at some distance. A third class presents nothing tangible, but exhibits the property of diffusiveness only; and many physicians deny that there are any means of positively establishing the claims of the latter to rank with the two former. These present no fixed or palpable *materies morbi;* all attempts to convey them from a diseased to a healthy body directly, have failed; there is much irregularity and uncertainty in the proportion of numbers infected upon near approach. Such is typhus; such pertussis; such puerperal fever; such yellow fever; such cholera asphyxia.

As in all other zymotic diseases properly so called, there is in each of these a capacity of self multiplication and reproduction. Each proceeds according to its own laws of appearance, increase, and decline; but in all, the phenomena of their extension and propagation; their great diversity of localities, their attendance upon migratory masses; their prompt multiplication under fostering contingencies connect them closely with the undoubted, undenied contagions. These are not modes of existence or laws of causative action of any known inorganic elements.

That the *materies morbi* in the disputed instances under consideration finds a necessary or appropriate nidus, centre, or habitat in the human body, is also evident from the fact that these diseases only or chiefly prevail where there is crowded human life, whether in cities, camps, caravans, or emigrant ships; and that their virulence is, as a general rule, directly proportioned, *cæteris paribus*, to the density of population.

If we deny the organic, self-reproductive character of the cause of these zymotic diseases, we have to contend with insuperable difficulties. Let us select the example of the last mentioned pestilence—Asiatic cholera. It is so widely prevalent, that immense masses of the causative poison which excites it must exist on the earth's surface. This poison must either be generated by local causes everywhere, wherever it is active, or it must have been produced originally in infinite abundance to admit of its effective diffusion over such vast spaces. The first notion is most generally entertained, but surely nothing can be imagined more contrary to all experience or analogy—may we not say more difficult to conceive possible—than the telluric elimination, or the atmospheric production of the same inorganic poisonous element in the depth of a Russian winter, and in the burning heat of summer in Hindostan; bidding defiance alike to climate and season, and overriding all local contingencies, all geological and geographical peculiarities; prevailing where the ground is frost-bound and covered with snow, and where malaria steams up from the hot marshy soil; alike fatal on the swampy delta of the Mississippi, and the arid sands of the Great Desert; in the purlieus of St. Giles, on the banks of the crowded Thames, and on the desolate steppes of Tartary; on the granite of Staten Island and the calcareous and coal formations of the west; along the sea-coast and the wide fresh-water lakes of our interior, and even exploding vehemently with the most startling abruptness among the passengers of more than one solitary barque on the boundless ocean.

If the other horn of the dilemma be chosen, the difficulties are not lessened. Wandering veins of atmosphere, filled with the cholera poison from the supposed inexhaustible source of its production, coming we know not whence, and tending we know not whither, must be imagined to be perpetually in motion, crossing the track of ships at sea, touching upon the coast at remote points, as at Quebec, Sandy Hook, Folly Island, and New Orleans, and traversing continents along the angles and windings of roads, canals, and navigable rivers. Some of those who admit and contend for the organic nature of the germs constituting the *materies morbi* of certain forms of pestilence, as in the example of cholera above chosen, nevertheless broadly deny their contagious character. This is, in each instance, a simple question—yet perhaps not always easy to be clearly settled—as to the habitat of the germ; its favoring soil, its proper nidus, its source of nourishment and growth. If these be in the human body, if, as Prof. J. K. Mitchell expresses it, "the affinity is to the person, rather than the place," then it is properly a contagion; if not, not. But its history shows it to be specially migratory; and it ought to be noted, that it never occurs spontaneously or accidentally to one visiting an unpeopled region. Contrast it with malarious fever, intermittent or remittent, in this regard. Let a healthy man sleep in a solitary rice field, a desolate jungle, or a wild swamp in a summer night. He will almost surely be seized soon after with disease of known and anticipated type. But an attack of cholera can only be procured among subjects laboring under the pestilence, or in their neighborhood, or as infected by fomites imbued with its material cause. This may be transported with persons anywhere; it remains fixed nowhere, but goes and returns.

Contagion never distinctly detected, as I have said, never isolated or set apart, presents itself to us in many alleged *forms*, *conditions*, and *modes of combination*.

1. In the newly-produced fluids of the exanthemata—the *lymph* of vaccine and variola.

2. In the *pus globules*, found subsequently in the pustules in these diseases, and in the pus of syphilis, gonorrhœa, Egyptian ophthalmia, and plague bubo.

3. In the *ichorous* or *serous* exudation of herpes, hospital gangrene, and perhaps of erysipelas.

4. In the *blood*, diffused, as in scarlatina, measles and smallpox.

5. In some of the *normal secretions*, the *tears* and *saliva*, rendered contagious by this morbid admixture, as in measles, and in the lower animals, hydrophobic.

6. In the *cell*—Langenbeck and Klencke tell us they have repeatedly conveyed cancer by inoculation with the cancer-cell.

7. In connection with the presence of *visible animalculi*, especially in psora; perhaps in chancre-pus also; and, as Velpeau believes, in hospital gangrene.

8. In connection with visible though *minute vegetation*—algous or fungous, as in tinea, and in porrigo, mentagra, and plica-polonica.

The *modes of application* in and through which contagions exhibit their power or infect the healthy system, are also widely various.

1. Some require a wound into which matter in palpable form is to

be introduced by *inoculation*, or application where the cutaneous protective integument has been abraded or otherwise removed, as vaccine, herpes, tinea capitis. Under this head we must include those which are transmissible by sanguineous inoculation, if we may so term it, transfusion of blood. Home, Speranza, and Von Katona, have conveyed measles and scarlatina by this means. Coleman thus communicated in the horse both farcy and glanders, and others have in the same manner transmitted malignant pustule, mange and hydrophobia.

2. Some affect the sound or unbroken skin, seeming to penetrate it under circumstances of close and *protracted application;* as psora, syphilis, gonorrhœa. Ceely affirms the same thing of vaccine also.

These are the palpable contagions and their modes of infection; the impalpable contagions exert a more extended and dreadful potency.

3. Some of this class require the remaining for a notable interval of time, within a confined space of air impregnated with the specific contagious exhalation. This condition of *confinement in vitiated air* of concentrated infection, is favorable, doubtless, to all the diversities of impalpable contagion, but is unfortunately necessary in but a few. These are typhus, hospital gangrene, and erysipelas.

4. Certain others are of prompter efficiency, and act upon transient exposure, but require *near approach.* Russell says that he prescribed with safety for patients ill of the plague beneath his window, which was fifteen feet from the ground, and being near-sighted, sometimes approached within four feet of the sick. Currie and Haygarth, after great attention to the subject, are disposed to contract these bounds, scarcely allowing of any danger of infection, under ordinary circumstances, beyond two or three feet from the body of the patient. It is obvious, however, that all attempts at such estimate must be vague and uncertain; yet, it is universally and confidently believed that an interval between a diseased and healthy body gives security in proportion to its width, although its sufficiency cannot be distinctly calculated, and must vary with varying contingencies. Under this head we include a large number; scarlatina, parotitis, pestis, pertussis, measles, and smallpox.

5. *Atmospheric diffusion.*—This is the most important and injurious of all the modes of action of contagion. Nothing is better known than the fact that all the last mentioned class of diseases—of which we may take smallpox as the type—may, when introduced into any locality, remain almost dormant, or extend themselves, as above described, slowly and progressively, assailing such subjects, and such alone, as are exposed by near approach to the sick, and having exhausted the stock of such, gradually disappear and die out; and the additional fact that, at other times, and in strongly contrasted manner, they suddenly emerge from this condition of mere protracted existence or slow growth, and explode, as the phrase is, seizing large numbers of persons in quick succession, and rapidly widening their sphere, and spreading from place to place. From many well known examples of this kind, familiar to all practitioners, we cannot hesitate to infer that contagious matter is capable of acting by and through the means of such radiation, diffusion, impregnation, or contamination of the atmo-

sphere. They are thus said to become *epidemic;* when spreading slowly by contact or near approach from one person or house to another, in observable succession, we call them *sporadic.* The distinction is marked and well drawn. When contagious diseases have become epidemic, they attack great numbers who have not approached any cognizable source of infection. In the winter of 1847, 1848, I attended forty patients ill of smallpox in the city of New York, not one of whom had ever seen a case of the malady, nor had consciously visited any infected neighborhood. From these and similar histories, we conclude that, when the atmosphere of any given locality thus becomes pestilentially infectious, either the atoms of contagious matter must be diffused in prodigious abundance from its human sources, or that there must exist some other source, atmospheric or telluric, from which the disease or its cause may spring. But setting aside all the controverted instances, such as plague, and yellow fever, and dysentery, no one is disposed to contend for such spontaneous production of measles, or smallpox, or scarlatina, or hooping-cough, all of which present themselves as sporadic and epidemic. In this field of interesting inquiry and hypothesis I do not hesitate to offer the suggestion, as at least a reasonable conjecture, that in the animal exhalations, infinitely abundant and varied, that are collected about the dense population of a crowded city, the organic germs which constitute the matter of contagion, whether fungous or animalcular, may find occasionally all the elements essential to their germination and growth, and may propagate and multiply themselves in an atmosphere thus saturated with the pabulum adapted to their support and development. A bulb or a seed which vegetates in the soil ordinarily, may, as we see every day, grow without soil, if laid upon a surface which conveys moisture to its roots, as in the flourishing of rice laid upon damp cotton, and the budding of a hyacinth in a glass bulb filled with water. Nay, the air-plants, properly so called, furnish us with a still closer analogy; and perhaps we may find another in the history of those minute insects which will produce several generations successively, without access to their special food or habitat, as the aphis, and the common *tick* of our southern country, and numerous others alluded to by Owen in his *Treatise on Parthenogenesis.* Thus, then, whether we regard the *materies morbi* of epidemic contagions as of animal or vegetable character, there is no difficulty in comprehending their propagation and extension promptly, actively, and widely in dense populations and crowded cities—favored generally, as we notice, by heat, moisture, and atmospheric stillness, and repressed more or less by the opposite conditions of dryness, heat, and ventilation, by winds or dilution of air. Nor is there any more difficulty in explaining why a pestilence, usually sporadic, should thus be occasionally epidemic, than in pointing out the causes which make one season prolific in familiar fruits and insects, and another as remarkable for their comparative scarcity.

6. *Fomites.*—The matter of contagion, in all its diversified forms, is capable of being absorbed or of adhering to certain foreign substances which retain it in full potency, for indefinite lengths of time. These substances are called fomites. Odors are, we know, conveyed from

place to place by handkerchiefs, and various articles of clothing and apparel, which continue for some time to affect the sense of smell. A smoker preserves the scent of tobacco in his hair and beard for awhile, and will affect with its fumes the curtains and carpet of a room, nay, its furniture and its walls. In like manner, woollen cloths, blankets, and other articles of bedding, furs, and cotton goods, and folded packages of a great variety, will involve, convey, and perhaps concentrate the matter of contagion, impalpable as well as palpable. It is said to adhere, too, to the walls and ceiling of an apartment once infected.

The mode of action of such fomites is precisely that of the contagious matter with which they are imbued or covered. Cotton soaked in vaccine lymph requires insertion into a wound. Garments or furs full of plague matter infect upon near approach—the impalpable emanations spreading themselves around. Drake tells us of yellow fever (which, nevertheless, he does not admit to be contagious), that "it has been produced by exposure to the air which has escaped from goods sent from a city where the disease prevailed." (Vol. ii. p. 298.)

At the celebrated "black assizes" at Oxford, and again at Taunton and Exeter, the prisoners brought into court, from the jail, infected with a pestilential fever (under which they were not then laboring) the judges and others present.

Physicians have often been known to communicate in this way, to healthy persons, diseases from patients under their care; themselves not suffering by the conveyance. Copland thus infected two friends whom he visited after witnessing an examination of a cholera subject, *post mortem*, at a considerable distance. Perhaps the most striking examples of this sort are found in the conveyance of puerperal fevers by obstetric practitioners, of which a long list has been collected in the very conclusive essay of Prof. Holmes on this subject. One physician tells us of his having communicated this terrible disease by neglect in carrying with him *his gloves* only, having changed every other article of his dress.

Mills, in his *Statistics of South Carolina*, has related a case so strongly illustrative of the agency of fomites and the tenacity of adhesion, with which contagious matter is endowed, that it deserves insertion here. The parents of a family on Edisto Island had three children inoculated with smallpox. One of them, being an infant, occupied the cradle. This one died, the rest doing well. The bedclothes were washed and deposited in a drawer. More than a year afterwards, a child being born, was placed in the same cradle and supplied with the same bedclothing, which, throughout this long interval, retained the contagious matter in a state sufficiently active to communicate the disease to the little subject, who had never been carried off the island. Nor was there within its limits, either at that time or for a long while after, a single case known to occur.

It has been usual to speak of contagious diseases as presenting close and binding analogies, and indeed as governed by the same laws in regard to their origin, history, progress, propagation, and transmission. So far is this from the truth, that no two of them can be affirmed to be alike in many respects.

They arise under a great variety of conditions and circumstances. Smallpox, so often referred to as the type, is perhaps the most ancient and best known. We first recognize it clearly at the siege of Mecca in 569, and it soon after invaded Europe. But we have no detail of the contingencies in which it took its birth. We dare not affirm its spontaneous reproduction anywhere subsequently, but, as I have recorded above, it has repeatedly occurred where its transmission was not traceable. It was not positively pronounced contagious before the time of Sydenham; though we can hardly suppose the fact to have escaped notice.

Scarlatina was first distinctly described about the middle of the sixteenth century. Insulated cases frequently occur, not to be traced to any notable source, as often happens also with measles and with erysipelas; and hence an argument has been urged, illogically enough, against their contagiousness.

The same thing is true of mumps, hooping-cough, and dysentery. We see typhus fevers arise spontaneously every day, and afterwards spread by contagion. In 1817, cholera appeared at Jessore in Hindostan, whence it has spread all over the world, except a few insulated points to which commerce has not yet conveyed it. Long may they continue exempt from so terrible a pestilence! In 1847, the dengue arose probably in the same region, or not far distant, and found its way across the Atlantic and the Caribbean Sea to our shores in a single year. Its visit was repeated in 1850, and, like cholera, it may now be considered, I fear, as domesticated and naturalized among us. It is very much disputed when the pestilential fever of Africa was brought to America; it found, however, a soil so congenial that a large majority now look upon it as perennial if not indigenous at many points along the coast, both insular and continental, from New York to Rio Janeiro.

Some of these contagious diseases are endowed with the beneficent property of causing by their influence on the human system an alteration so great and permanent that an individual once affected by them is thenceforth secured from any subsequent attack. This change and consequent immunity forms the recognized and beneficent rule; but there are numerous exceptions. It does not apply to any but the febrile contagions. Even of these there are many that do not obey it, as erysipelas, dysentery, cholera. The rest differ in the completeness of the immunity, that is, in the proportion of repeated attacks likely to happen. Smallpox is not, I think, so thoroughly self-protective as measles, or scarlatina, or hooping-cough, or mumps. We very seldom hear of second attacks of these four maladies, while variola presents a long list at every time of its epidemic prevalence; and besides there are many persons who are liable to take it always when exposed. Numerous instances of this kind may be collected from the books; I shall mention, in addition, a recent one, the late Dr. Woodward, of whom his biographer records his having suffered from three attacks. Yellow fever gives this immunity in a remarkable degree; yet allows it to be obscurely impaired by change of residence. It is not settled whether it belongs, notably, to typhous fevers. Of dengue it is certainly thus far uncommon to witness a second seizure.

Most strange of all is the instance of vaccine, which protects so admirably against variola—temporarily, without doubt, if not permanently; yet does not prevent any frequency of repetitions of its own peculiar infection. How widely this sort of immunity extends and what contingencies circumscribe or limit it, ought to be carefully observed and studied by the profession. The obscure condition of the system in which this immunity consists—can we imitate it? Can we produce it by any other means than the natural obliteration of the liability by one attack? It is asserted and maintained by good authority, that belladonna produces at least a temporary insusceptibility to the action of the cause of scarlatina. Perhaps it is worthy to mention here the general belief of the Indians of South America, that by free inoculation of themselves at many points of the surface with the expressed juice of certain plants well known among them as antidotes to the poison of the venomous serpents that infest that region, they are permanently preserved from all risk of injury when bitten. If this should prove to be the truth, the suggestion thus offered may be hereafter pregnant of useful results.

Each individual among them has its own characteristic duration, and is in this sense *self-limiting*. The periods of incubation, of access, of increment, and of decline, are different in all. When we can infect by inoculation, we obtain a definite idea of the latent period, as it is called. Smallpox matter thus introduced remains dormant until the fourth day. When invading spontaneously, by means of atmospheric inquination, some constitutional derangement is apt to show itself about the ninth or tenth day. Dr. Whytt was seized with the plague three days after inoculating himself with matter from a pest bubo. Of measles the latent period is so indefinite that nothing has been fixed on; it is probably about a fortnight. Bigelow tells us that he "knew a patient taken with scarlet fever in 48 hours after arriving in this country from Europe by a passage of 40 days. Here the latent period must have been less than 2 days or more than 40." The time of incubation is supposed to be generally short—not more than 6 or 7 days. Withering says he has known it as brief as 3. I saw a subject attacked with dengue 3 days after his arrival in Charleston while it was prevailing there. Typhus has an interval of great length at times, but cases are given by Marsh, Tweedie and Gregorie, of instant affection by the febrile contagion. Of some we have no incubative period conjectured, as of erysipelas; and hydrophobia is totally indefinable. It has been affirmed to extend from a few weeks to as many years. I attended a case in which the bite was given in September, the patient being attacked and dying in February following; and with Dr. Bellinger another who, having been bitten in April, sickened and died in August. Both were boys; one 3, the other 10 years of age; one white, the other black.

Contagious febrile diseases are self-limiting; that is, each has its regular term. This differs in each case. Smallpox declines after 8 or 10 days; measles from 3 to 7; scarlatina mitis lasts about a week, if malignant is almost indefinitely protracted; hooping-cough persists from three to six weeks, and typhus from 14 to 28 days; erysipelas and dysentery show no tendency to a fixed limit; cholera varies so greatly that it has not been submitted to a calculation; yellow fever concludes its course in about 5 to 8 days.

Much has been said of *contingent contagion—as though all contagion were not contingent.* If what has been said of the nature of this specific cause of disease be true, if indeed it be an organic germ, semi-individual, self-multiplying, like other germs it needs fostering or favorable conditions to retain its vital powers and become reproductive. If, on the other hand, it is inorganic, it will not therefore be freed from the influence of contingencies favorable or hostile to its action. On the first hypothesis we may refer to the general analogies of nature. Some vegetables grow everywhere, or almost everywhere readily. Others demand very special qualities of soil and climate to sustain them. Animals differ in like manner. The camel and the elephant are confined to a very limited portion of the earth's surface, while the dog and the horse follow their master into every region. Some contagions are limited by season, as yellow fever and dysentery, autumnal affections. The plague has never transcended the bounds of the temperate zone; seeming to be repelled both by heat and cold. Dengue as yet is known only in warm climates. Yaws prevail in hot countries, and perhaps belong to a single race; sivvens is known only in high latitudes.

Smallpox, measles, scarlet fever, and cholera, bid defiance to all *known* contingencies. Certain unknown circumstances, however, favor on the one hand, and on the other impede their extension and progress. All races, in all climates, and at all seasons, seem liable to their attack. Individual differences of liability, however, are strongly marked. Inoculation with smallpox fails not unfrequently; nor is every one seized who is exposed by attendance on the sick. Every physician must recollect his frequent annoyance by failure of his attempts to vaccinate. I have seen unavailing insertions of vaccine matter carried to the twentieth and twenty-first time before success was attained. Seasons seem to affect this liability to the disease in hot climates; it is not easy to vaccinate children there during the summer, so that it has become almost a custom to let the vaccine die out during the warm months, and until the return of winter. I have heard a medical missionary to the east affirm that seventeen years passed away before they were able to succeed in introducing the vaccine into Siam.

After all this, it is strange to see daily arguments urged against the contagiousness of diseases—of no palpable secretion—based upon the frequent failures of cases, when introduced, to convey the infection.

It were to be wished that there were tables kept of the proportion in which inoculations with known and tangible contagion of various kinds have proved effectual. Nothing of this sort is within my reach, except what I have found in a report made to the Academy of Sciences at Paris, by M. Renault, published by the *Gaz. Méd.* for January 17, 1852, in reference to the proportion of efficient wounds or inoculation, of hydrophobia. In the hospital of the Veterinary College at Alfort, of 224 dogs bitten in the streets by mad dogs, or dogs alleged to be mad, 74 became mad, 150 were unaffected; two-thirds (⅔) escaping. Of 99 animals, dogs, horses, and sheep, inoculated or bitten under observation by dogs surely mad, in parts thinly protected with hair, 67 became mad, 32 were unaffected; one-third (⅓) escaping.

At Lyons, of animals accidentally bitten or inoculated, the proportion attacked was for dogs, 1 in 5; for horses, 1 in 4. Of animals bitten experimentally, two-thirds (⅔) were attacked as at Alfort. At Toulouse, not more than one-third (⅓) were attacked; 5 in 16. At Berlin, of 137 bitten in the streets, 16 only were attacked; of 25 bitten experimentally, 10 were attacked. It is suggested that climate influences the proportions.

Prof. Austin Flint tells us that he was informed at Alfort that the saliva from a rabid horse does not communicate the disease; while it is readily produced by inoculation with the saliva of a rabid sheep. This is a very curious fact, and goes to show that we cannot anticipate on any known principles the mode of communication of contagion. If the subject is thus obscure, when we have a palpable form of the morbid matter to deal with, how much more it is out of our reach in the impalpable exhalations; and how futile the experiments of Chervin, Foy, Firth, and others, who have eaten and drank of foul and vitiated secretions. Smallpox matter and the venom of the rattlesnake are both swallowed with absolute impunity. So is bread soaked in hydrophobic saliva.

I repeatedly inoculated and many times vaccinated in vain a young lady, who attended a sister that died of smallpox, besides being often exposed otherwise. She seemed invulnerable by both contagions. On the other hand, some take variola repeatedly. Baglivi tells of a man who died of the eighth attack. Some persons similarly refuse hooping-cough, and measles, and scarlet fever. The general rule is supposed to be, that every one is born with a predisposition to the exanthemata. One attack of either of these maladies is supposed to destroy this predisposition by exhausting or removing some original element of the blood or tissues upon which the contagion acted, or which served as its pabulum. In some instances this is not all exhausted; hence the occasional liability to frequent repetition. In others, it is renewed at long intervals of time, hence, as in smallpox, the necessity of revaccination or adult inoculation. This principle has been even extended to some non-febrile contagions; as in the immunity alleged to be purchased by protracted or repeated syphilization.

Some escape attacks of contagious diseases, however exposed, by a happy peculiarity of constitution, or by an unconquerable vigor of healthy action. This latter condition is supposed by Prof. Carpenter to constitute a secure defence against cholera. "I firmly believe," he says, "that if the blood of a person of sound constitution be kept in a state of perfect purity by the moderate but not excessive use of wholesome food and drink, by the respiration of pure air; by adequate exercise not pushed to the extent of over-fatigue, and by personal cleanliness, he is as completely protected against the invasion of cholera, as he who has been effectually and recently vaccinated is proof against smallpox." There is, indeed, some truth and reason in this view, but it is expressed far too strongly. Not to lay any stress upon individual exceptions which every practitioner must have met with, we may refer to whole tribes, such as the Kalmuck Tartars, whom Dr. Verrollot describes as "the type of physical man, of man in good health," who suffered greatly from the invasion of cholera when it traversed their wide steppes in 1847, dying of it, as he calculates, in the proportion of 50 per cent. Mongazon gives us a similar account of its ravages among the Arabs of the Desert beyond Tunis. The red man of our western world sinks also promptly beneath it. I select these instances, because civilized life is supposed to present some general diminution of vital force in the masses. Cholera is, however, in a certain degree, a respecter of persons, and is doubtless somewhat kept aloof by the conditions so graphically recounted by Dr. Carpenter.

The same thing is unquestionably true also of all contagions; and hence the universal value of proper sanitary regulations, especially in large cities. Some contagions spread slowly, if at all, in well kept and clean localities. It may be doubted whether plague could exist in such places; and if it were not for some few recent instances, we might also hope thus to arrest the progress of yellow fever. But within a few years, it has been known to exert a fatal vehemence in small villages of high character for salubrity.

It is evident from these statements, that we cannot arrange contagious diseases, as many have attempted to do, by a reference to their supposed differences in degree of power of infection. Each has its limit; each its special force. While some progress irresistibly, but with comparative slowness, as smallpox and the exanthemata, others diffuse themselves with a rapidity and comprehensiveness utterly mysterious, as dengue and cholera. It is also incomprehensibly true of them all alike, that they decline and disappear after a brief reign, leaving many terrified but unhurt subjects, whose escape from attack is as incomprehensible as it is fortunate.

It is an interesting question, too, at what stages contagious diseases are communicable. Like a plant or animal, they require time for full development. Prof. Clark is of opinion that variola is not noxious until the vesicle is formed. We know not when the body of the convalescent ceases to be a centre of contagion. The same is true of all. If a patient die early, therefore, under the force of any virulent pestilence, he may not be a source of further infection. May not a similar abortion, so to speak, occur under the perturbing influence of active treatment, which therefore, if it fail to relieve and save the sufferer, may so interfere with the full development of his malady, as to preserve those about him by preventing the elimination of the materies morbi in his system? A peach unripe—a rose unopened, fail of the production of their special elements of flavor and fragrance.

Rules have been offered for the determination of the contagious character of disease. Inoculation will decide where any palpable matter is formed. Where there is no visible product, we must be guided by rational inference from observed facts; such as:—

1. Repeated spread among those surrounding a sick man.
2. The occurrence of repeated cases upon exposure to varied

fomites; these are circumstances which give obvious reasons for the belief of the contagiousness of any maladies of which they are predicable.

3. Progressive extension from a first observed locality.
4. A decided preference for dense populations.
5. Repeated migration with travelling persons or bodies.
6. A preference for the ordinary thoroughfares by sea and by land.

Having ascertained the contagiousness of any form of disease, its modes of communication or invasion, and its latent period, we are prepared to inquire into the means of arresting its progress. Seclusion of the sick subject, as far as is consistent with humanity, and the prevention of the introduction of the matter of contagion either as connected with the diseased body, or with fomites of any kind, or as diffused in atmospheric air, these are the proposed methods. Quarantines—for so all protective institutions are termed—should be established on rational, relevant, and humane principles. A comfortable hospital or lazaretto should receive the sick, who should be provided with every necessary of life and every possible comfort. Connected with it, and sharing the same prohibitions, should be a good lodging for those who, exposed with the sick and liable to become diseased, or act as fomites, require also to be segregated for a time. This should refer to the period of incubation; if known, we may protract the restraint imposed to double its average length, for the sake of probable security. All fomites should be cleansed or destroyed. Correctives of contagion are scarcely to be trusted; they are lime, heat, chlorine, and acid fumes. Perfect cleansing is best done by washing and ventilation; the others may be added. A ship should be emptied and purified, in all these suggested modes.

To carry out these measures involves great expense, and requires a great sacrifice of personal liberty. Quarantines are, therefore, in the highest degree distasteful throughout our country. The facilities for evading all imposed restraints are exceedingly great, and the laws as opposed to popular feeling, extremely difficult to be enforced. It may be acknowledged to be impossible to lay any useful restrictions upon travel by land, or the internal intercourse of one part of our country with another. It is, therefore, an open question whether in any community it is desirable to make these efforts—to establish a quarantine. If unimpeded commerce be the greatest good to a given population, let there be free trade in disease as well as in other objects of importation. If, on the other hand, the public health be the highest object, it will be well to institute internal measures of hygiene to bring the locality into its highest sanitary condition, while every attention is given to repel the entrance of contagious diseases from abroad by the most precise and exact ordinances of prohibition. Superfluous regulations of the restrictive character have often been stigmatized as cruel; the imputation will lie more correctly against such as are inadequate.

4. Aerial Poisons.—Diffused throughout the atmosphere, there exist, under varying circumstances, numerous and diversified agents, whose influence is hostile to human health. Besides the contagions

dissolved in the air surrounding sick bodies, of which I have already treated, and the unfriendly winds which in different localities are disliked and dreaded, among which I made special mention of the undefined, but universally evil influences of those which blow from the easterly direction—the bize, the simoom, the sirocco, the khamsin—we shall, on inquiry, find a host of causes of disease of definite character, known to us not by their sources or origin, but by their mode of application in the medium which surrounds us, and acts upon all our surfaces, digestive, cutaneous, and respiratory. It will be convenient to consider these under the several heads into which they are naturally and obviously divisible.

1. The ordinary elements of respirable air are only useful and life-supporting in the proportions in which they are naturally mingled. Each of them is in itself absolutely irrespirable, and will, if breathed alone, extinguish life promptly. Oxygen, or vital air, is a stimulant of extreme power; but it is nowhere produced in dangerous excess. I cannot help thinking, as matter of rational inference, that the pure air on the sea and in the country contains it in larger relative amount than that of cities, in which so much else is mingled, and so much demand is made for what naturally exists, that its proper proportion is defective; but chemists assure us that this cannot be proved—an assertion which, while I do not doubt, I suppose merely to mean that eudiometers are as yet far from being very precise or exact. Nitrogen, the diluting element, which, whatever else may be its office, is chiefly useful, as preventing by admixture with it the excitant effects of oxygen, is also very uniform in its relative quantity. We know not of any irregular or accidental means of supply of this constituent, nor of any evil ascribed to its superabundance or deficiency. Not so, however, with the third element of atmospheric air, carbonic acid, which, always present in small quantity, is nevertheless subject to remarkable variations. By its weight, which is comparatively notable, it collects itself in hollows, and depressions, and pits, and wells. It is also produced in large quantities, in certain places, by processes going on from time immemorial; sometimes combining with waters flowing there, as at Saratoga, and Seltzer, and other Spas; sometimes effused upon the surface of the ground, where its presence is shown by its deleterious effects.

Nothing is better known than the risk which is run by those who work in vaults and wells. They are asphyxiated, by want of respirable air; and, besides, as Goodwyn has proved, they are positively poisoned by the specific qualities of this gas. Experiments frequently repeated at one of the places where it is largely developed, the Grotto del Cane, in Italy, have made us familiar with its effect upon animals. A dog, whose muzzle is held down near the floor of the grotto for a minute, falls senseless and incapable. He soon becomes convulsed, and froths at the mouth. If withdrawn in a half minute more, and laid on the ground in good air, he recovers, and more promptly if cold water be poured upon him. If he remain within the grotto for double the time mentioned, the result is said to be fatal. The symptoms which affect men who descend carelessly into wells and vaults are similar.

The subject falls asphyxiated, incapable of motion, insensible; his face is livid or purple; animation is entirely suspended. The best remedy seems to be the shock of cold affusion. A vein should be opened in the arm, and the blood, if possible, made to flow. The skin, and eyes, and nostrils should be irritated by heat, mustard, and the vol alkali.

To guard against accidents of this kind, it cannot be too often repeated, that, previously to the descent of any one into a deep cavity, natural or artificial, a lighted candle should be let down. If this continues to burn brightly, the air will be found sufficiently pure for the purposes of respiration; if it is extinguished, or grows dim, we must infer the presence of a poisonous proportion of carbonic acid gas. Quicklime should be thrown in abundantly enough to absorb, while slacking, the dangerous amount, and the test of the burning candle reapplied until that fact is proved.

Ordinary combustion, which presents many analogies with respiration, gives out large volumes of this gas; and thus, by combination, too, destroys the necessary proportion of oxygen. Many accidents happen from this cause in ill-ventilated, small apartments. Thus died, among numerous others, two young men on board a small vessel in the harbor of New York. They warmed their little cabin, in a bitter winter night, with a pan or stove of lighted charcoal, and were found next morning quite dead. It has become, indeed, of late years, a very fashionable mode of suicide in Europe. Closing the doors and windows, and lighting up a brazier of coal, a young man of France, the son of a celebrated chemist, chose this method of dying, and entertained himself by writing down, from time to time, a record of his thoughts and sensations. Before the writing ceased to be legible, it was evident, from the expressions used, that his mind had wandered.

In the great breweries of London, it is not only unsafe to venture down without proper precautions into the great vats, but men have been known to become asphyxiated on lying down to sleep too near them, suffocated by the gas which poured over their capacious rims.

Nature has produced this noxious gas in immense quantity in two well-known localities; the one a desolate and deadly valley in the island of Java, filled with the bones of animals ignorantly wandering down the sides of the hills which overlook it; the other a mountain in Tartary, of which we have an interesting description in the travels of M. Huc. The exhalation exists only on the eastern and northern sides of the acclivity. Commencing the ascent, he says, "the horses very soon refuse to carry the riders, and every one advances on foot and with short steps; our faces grow pale; we feel our hearts sink, and our legs refuse their office; we lie down on the ground and rise again to make a few steps, then lie down again; and in this deplorable and miserable manner we climb this famous Bourhan-bota. One feels his strength broken, his head giddy, all his limbs seem dislocated, and he suffers a malaise exactly like sea-sickness; and, in spite of all this, he must preserve energy enough not only to drag himself along, but also to strike, with repeated blows, the animals which lie down every moment and refuse to go on. We exhaust ourselves in efforts to reach the end, and not to die on the way asphyxiated by carbonic acid gas.

When the wind blows strongly, these vapors are scarcely felt; they are dangerous when the weather is, as we found it, calm and serene. We remarked, too, that when we lay down we breathed with much greater difficulty, and that, while we were mounted on horseback, we scarcely felt the influence of the gas. It was very difficult to light a fire, and our fuel burnt with much smoke and little flame."

2. From a variety of sources we derive new elements of gaseous nature, which mingle with the air, and affect us thus accidentally, or to which we are subjected by the ordinary conditions of civilized life, or in the experiments of the laboratory. The most widely extensive of these at present is the carburetted hydrogen, with which we light our houses, and which, escaping from retorts, and reservoirs, and pipes, throughout our cities, offends us by its noisome smell, and occasionally suffocates the unconscious sleeper in an ill-ventilated chamber to which it has access. It is worth inquiry, whether its admixture with our city atmospheres in less than irrespirable or explosive proportion, is likely to influence the general health in any definite manner.

Sulphuretted hydrogen, which Daniel and Gardner affirm to be thrown out in marshy places, has been alleged to form the basis at least of febrile miasm. It is not, however, proved that fevers are more frequent around its best known sources, as in the neighborhood of the numerous sulphur springs all over our country; and in our cities, whose privies are inexhaustible sources of this and other foul and offensive exhalations, periodical fevers, the product of malaria, are comparatively infrequent. Seleniuretted hydrogen and chlorine in our laboratories excite irritation of the mucous surfaces with cough. Nitrous oxide is a delightful exhilarant and a valuable anæsthetic; yet its use is not altogether free from risk. I have known it followed by protracted muscular and nervous debility, by pulmonary inflammation, and by a certain degree of irregularity of intellection. This is also the proper connection in which to speak of ozone, an aerial agent, which has of late attracted very much the attention of chemists and pathologists. Prof. Schönbein, of Basle, who first brought the subject before the profession, considered it a peroxide of hydrogen. Draper and Faraday, whose authority is conclusive, pronounce it a merely allotropic condition of oxygen, which is found in three states: passive, as in the atmosphere ordinarily; extremely active, as in combustion; semi-active, as in ozone. It is a very irritating substance, producing in man pain and inflammation of the mucous respiratory surfaces, and acting as an energetic and fatal poison upon small animals. Schönbein, Polli, Heidenrich, Spengler, Quetelet, and Moffat, believe that there is a direct relation between the amount of ozone in the air at any time and place, and the extent of catarrhal disease, or influenza. Some of our western brethren have maintained that it holds a similar causative relation to cholera. It is a most rapid oxidizer; it destroys sulphuretted hydrogen, phosphuretted hydrogen, and all foul effluvia, and hence may be considered the great purifier of air. It is thus exhausted in large and populous cities and crowded dwellings, but may be found in abundance in the open air of the country and at sea. Faraday thinks that the kind of change which we call decay, or eremacausis, is the result of its action on dead organic matter. Schönbein regards its purpose to be "the purification of the atmosphere from the deleterious gaseous matters afforded by the decomposition of vegetable and animal substances. This, which we attempt on a small scale by chlorine fumigations, is effected in the great processes of nature by the agency of ozone. In its turn it is decomposed or neutralized by the miasmata." "During a thunderstorm, large quantities of it are formed through the air; and it is thus that storms purify the atmosphere." In winter it exists more abundantly than in summer. The electrical attraction of the tall pine-tree and its linear leaf, and the probable influence of the electricity thus gathered upon the air of pine lands, has been ingeniously suggested as explaining their well-known freedom from malarious disease. The whole subject is well worth further study, and every physician should have at hand an ozonometer for observation. Polli's is easily prepared. Dissolve in 400 parts of water 10 parts of starch, and 20 of iodide of potassium. Expose to the air, and note whether on "blue days," as they are called by Schönbein—days remarkable for the promptness with which the blue iodide of fecula is formed by the rapid oxidation of the potassium—there is any special invasion of catarrh, or rheumatism, or any other malady. Heidenrich affirms curiously enough that while pulmonary phlegmasia seemed to coincide with ozonic reaction, pleurisy was indifferent. But the whole topic is new and open to the careful inquirer.

8. There are many animal exhalations which rise into and render the atmosphere impure and deleterious to health. The crowd poison, ochlesis of Gregory, is doubtless a very compound mixture of ammoniacal effluvia, with carbonic acid gas and certain undefinable and unnamed volatile substances, often odorous and highly offensive, given off from animal bodies both in a state of health and disease. A terrible instance of the effects of confinement in a close apartment is recorded in history as having occurred in Calcutta, upon its surrender to the Subah of Bengal, in 1756. One hundred and forty-six of the English garrison were confined in a narrow dungeon during a hot, airless, and miserable night; one hundred and twenty-three perished before morning, and the few who survived suffered greatly, and recovered slowly their impaired health and strength. The concentrated poisons, whose effect is so strongly exhibited in this extreme example, are productive in intermediate degrees of varied morbid influences, as implying the presence of diversified noxious agents. To this we attribute the well-ascertained fact, that general mortality is everywhere in proportion to the density of population, when that transcends a certain rate. To it also we ascribe the known insalubrity of cellars as domicils. Typhus is generated surely by it. It increases the proportional frequency of phthisis. Baudelocque and Toynbee attribute to it scrofula, deafness, and otitis.

The products of animal putrefaction are, many of them, to be spoken of here, as gaseous, or soluble, or diffusible in the atmosphere, thus assuming the aerial form. Volatile matters of highly disgusting odor are thus eliminated, offending our senses, and giving rise to nausea, syncope, and even asphyxia. Yet it is evident that the alleged effects which we are to notice, are not all of them accounted for by the appreciable gases which are released during the decomposition of animal matter, and with which the chemist is familiar; it is equally evident that it is not merely the unpleasant impression made upon the olfactory nerves, and the sympathetic disturbance thereby excited; for many persons are sickened who feel no disgust, and in whom prostration and fever are not preceded by nausea. It is further true, that in some places where the most offensive collections are presented, as in tanyards everywhere, in districts where fish are largely used for manure, in manufactories of poudrette, in the knackeries near Paris, and in soap-boiling and adipocire making establishments, the residents and workmen often enjoy apparently good health. Yet, on the contrary, we can adduce, both from ancient and modern history, numerous examples in which such putrefying masses gave rise, obviously and undeniably, to violent disease and extensive pestilence. The putrefaction of bodies left unburied or imperfectly inhumed on fields of battle, have repeatedly given rise to wide-spread maladies in neighboring districts. The danger of interment within the limits of cities and towns has been of late the theme of frequent discussion, and the festering cemeteries of London and other great cities have been proved to be abundant sources of disease and death. On the continent of Europe, where the practice of burial in and beneath the churches, as peculiarly consecrated ground, prevailed long and widely, chemists have been repeatedly called on to disinfect these sacred edifices, and purify, by the employment of supposed counter-agents. A memorable example of the evil here discussed is given by Maret, as occurring at Saulieu, in Burgundy, in 1773. "A grave was opened in the church of St. Saturnin near another in which a large body had been interred twenty-three days previously. From the opening there issued a very fetid odor, which filled the church, and affected every one who entered. Of 170, there were taken ill with a malignant putrid fever 149; eighteen died, among whom were the vicar and curate of the church."

Walker, in his *Gatherings from Graveyards*, and Pascalis, of New York, have collected many similar instances; but it seems to me unnecessary to enter into any labored course of reasoning, or offer any lengthened recital of examples to establish the doctrine thus generally received. The evolution of large masses of irrespirable and noxious gases must inevitably pollute the air. Nature warns us by the offensiveness of the effluvia thus thrown off, and by the languor, nausea, and prostration which they directly induce, of the danger of exposing the system to their mischievous influence.

Of the alleged instances in which such masses of putrefying matter have proved harmless nuisances, I would remark, that none of the causes of disease are invariably and under all circumstances active and efficient; that they all need, to give them force and make them operative, some concurrence of favoring conditions; and that they require a certain degree of concentration and of intimate application to enable them to disturb the healthy action of a vigorous constitution. The morbid results of exposure to this class of causes do not seem to be very definite, or perhaps they have not been traced with sufficient industry. There is, however, a general agreement in the opinion, that the typhoid affections, those which imply a low form of fever, with vitiation of the circulating and secreted fluids, are most likely to arise from this source.

The exhalations from cesspools and privies constitute a most annoying form of contamination of the atmosphere of towns and cities. Night-men suffer asphyxia, prostration, and death, as we are told, not unfrequently in the labor of removing or abating these nuisances. It is not easy to portray the less pronounced but surely unavoidable injury inflicted by their presence upon those inferior classes of all communities who are doomed to more immediate propinquity to them, and the diffused influence upon the whole population. In recent reports from German investigators, Thiersch, Petenkoffer, and Liebig, we have it distinctly stated that privies, and sewers, and all such places become "real sources of cholera poison," and that the houses near such receptacles are more liable to invasion. They further affirm, that the cholera evacuations, when "in a state of decomposition, become fertile means of the propagation of the disease." A like opinion has long prevailed with regard to dysenteric excretions; and every careful practitioner enjoins their prompt removal to the greatest possible distance. The same thing must be true in general; and all hygienists must anxiously endeavor to remedy, correct, and control this revolting cause of disease. The best means of effectual sewerage constitutes at present the most important of the problems of civilization.

Animalcular putrefaction has been suggested as the cause of disease commonly attributed to stagnant waters and marsh miasmata. The purest natural waters, whether of springs or rivers, or from the clouds, soon begin to teem with minute life. Stagnation develops in each drop, millions of animated creatures of infinite variety of form and habits. I have often observed that the pure rain water collected among the clear white sand of our sea islands, if not drained off, soon became exceedingly offensive. The noisome smell was more intense and sooner perceptible, if a high tide had mingled with these fresh pools a proportion of salt water; in accordance with Sir John Pringle's statement as to the greater rapidity of putrefaction in such mingled or brackish waters.

All water in which vegetable matter has been infused is found specially filled with animalcular life. Dr. Dwight, "on examining the pellicle or scum which floats on the surface, perceived it exhibit, after a few days, an infinite number of living beings. On examining the same scum some time afterwards, not the least appearance of life was visible. In another short period, it was again replenished with living beings, and this alternate process went on until the water became insufferably fetid." This fetor he describes in forcible terms, as somewhat peculiar. "Although it was perceptible at a small distance only, and perhaps less loathsome than a corrupted carcass, it was far more suffocating; when the effluvia was received into the lungs, it seemed as if nature gave way, and was prepared to sink under it. A pungency entirely peculiar accompanied the smell, and appeared to lessen the vis vitæ in an unprecedented degree and manner."

4. A fourth class of aerial poisons remains to be considered. They

consist of such as are unappreciable either by our senses, or by any of our physical means of analysis. They are known only by their effects. Their very existence is matter of rational inference—not of observation, detection, or demonstration. They are among the causes of those great orders of disease, to be treated of hereafter, which we speak of as endemics, and local and general epidemics.

First of these obscure agencies, we proceed to treat of that undiscovered miasm to which we ascribe the numerous varieties of fever of periodical form, with certain other maladies regarded as congenerics.

We shall afterwards speak of endemic and epidemic influences, which give permanence and extension to many of our most familiar forms of disease.

Malaria.

This term is preferred, in compliance with modern usage, to the word *miasm*, which has both etymologically and in the writings of many physicians, an extension so wide as to include all aerial contamination, whether chemical, contagious, or epidemic. It is best defined as a peculiar distemperature of the air of certain regions, derived from sources to be considered in order, traceable only by its effects, and as yet undetected by any chemical or scientific investigations. Its nature is unknown; its very existence has been made matter of dispute; all the influences ascribed to it have been attributed to the mere agency of moisture, or of moisture associated with heat; an error, evidently, owing to the concomitance of these adjuvant causes, and their tendency to promote its efficiency.

The principal source of malaria is believed to be found in the decay and decomposition of vegetable matter. Vegetable putrefaction develops animalcular life and fungous vegetation. It gives out, often, unpleasant odors and gases unfit for respiration. It is always unfriendly to human life and health, and even in the most local and limited way, as in the foul hold of a ship, or a potato cellar, is capable of originating serious evil. The growth and production of vegetables, as well as their subsequent decay, are fostered by the presence of moisture and the action of high temperatures. Certain effluvia, thus disengaged, produce forms of fever and other diseases, whose recurrence is regarded as proving the presence of malaria; an agent capable of being everywhere identified by these, its effects. Hence malarious fevers appear in summer and autumn, and are intense in proportion to the temperature of the region affected. In hot countries the plague, yellow fever, bilious remittent, cholera; in colder regions intermittents of chronic character, hepatitis, jaundice, have been ascribed to this cause. Cold, when sufficiently intense, puts a check to the influences of malaria. Heat promotes the action of malaria by generating a predisposition in the system favorable to it, and by stimulating and afterwards relaxing the vessels of the skin and liver. Moisture is not only necessary to its production, but likewise becomes the medium in combination with which this poison acts upon the body—a combination, it would seem, of essential necessity to give it effect. Hence the known insalubrity of dews and fogs in malarious districts, and hence the advantage of elevation from the exhaling soil.

A certain degree of concentration and a certain amount of dose are necessary also to the efficiency of malaria. It is in this property chiefly that *a virus*, technically so called, differs from *a poison;* the former being independent of both these circumstances; thus, the smallest particle of variolous or vaccine matter can affect the whole body. It may, indeed, be diluted to inefficiency, but if it infect at all, the degree of force of its action has no reference to the amount or concentration. The action of a poison, however, is always modified by the dose. This constitutes the principal objection against the doctrine of the organic nature of malaria, as consisting of animalcular life of ultra-microscopic minuteness, or of cryptogamic vegetation, equally beneath the reach of our vision, however powerfully aided. The sources must be large and extensive to produce malarious disease. A contagious virus adhering to any fomites in smallest amount is often efficient; but it is impossible to convey enough malarious atmosphere from the place which it renders deadly, or any of its constituents, animalcular or fungous, to produce disease at a distance.

There may be mingled with the atmosphere many substances in a state of diffusion, which chemistry has at present no means of detecting. Such are the odoriferous particles of musk and camphor, and the delightful fragrance emitted by the gay flowers which scent the air of spring; such the minute particles of opaque matter, darkening in greater or less degree the light of day, and tinging with peculiar hues the beams of the sun.

I have already said that it is from the similarity of the effects we meet with that we deduce the presence and identity of a common cause efficient in their production. Peculiar forms of fever, for example, precisely resembling each other in their modes of access, their type, their history, their various degrees of malignity under known circumstances, and the morbid changes they impress upon the several organs of the body, are observed to be endemic in many districts of the inhabited globe. The same description will apply to the fevers of our wide continent, whether on the margins of our great rivers or our interior lakes, upon the swamps of the Atlantic coast, or our rich rice fields, and those of the fens of Lincolnshire, in England, of Carthagena in South America, of Corunna in Spain, those of Savoy, and the fertile plains of Lombardy and of Walcheren in the Netherlands. For this, Batavia, in the island of Java, has been called the grave of strangers. By this, the prospects of African colonization are delayed, and Liberia and Sierra Leone decimated. It is this, which renders British dominion in the Indies so expensive in European life. To this, is owing the comparative desolation of the ancient mistress of the world—the queen of nations—the eternal city. The malaria arising from the whole surface of the surrounding country, the solitary Campagna, and the Pontine Marshes, annually extends its encroachments through her streets and noble squares, and threatens the entire depopulation of her seven hills.

The prevailing opinion that such fevers are of specific nature, and derive their origin from a peculiar morbid agent or poison, is maintained upon the following grounds: 1. The familiar series of concurrent and successive symptoms, the characteristic phenomena of these fevers, are supposed to be so marked as to demand *ex necessitate*, a reference to a specific and relevant cause. 2. The second position, implied, indeed, in the first, is the total inadequacy of all obvious contingencies and known modes of causation to account for effects apparently so uncertain and disconnected with them, yet under other and varying circumstances, so uniform and susceptible of repetition. 3. The *à posteriori* argument drawn from the unequivocal and impressive efficiency of the best, if not the only specific remedy known in our materia medica, cinchona, or its intimate principle, quina.

1. The periodicity of these fevers, so familiar, and yet so strange a fact, or series of facts, has not been, I think, sufficiently considered or studied. It is true that periodicity is a very frequent element of disease in general; nay, a certain degree of regularity of movement of alternating or recurrent conditions may, perhaps, be regarded truly as the rule, and its absence the exception, in the symptomatology of all morbid affections. Neuralgia rarely fails to observe this law with more or less precision; convulsive maladies generally, epilepsy and hysteria more particularly, show its influence; the return of hemorrhages may often be predicted; inflammations, irritations, and congestions are all known to recur at stated times, and even suppuration is occasionally suspended and resumed at exact intervals, as in the tenacious disorder of the frontal sinus and antrum maxillæ connected with influenza; organic changes of structure, scrofulous, and others, though, of course, themselves continuous, give rise to hectic of diurnal or double diurnal repetition, and the same periodical disturbance of the constitution often follows wounds and mechanical injuries. It is also true that all the healthy functions, actions, and habits of the system are either governed originally by some law of regular revolution or fall readily into a convenient obedience to it; and upon this normal course of movement seems, indeed, to be founded most of the phenomena of periodicity belonging to the history of diseases.

But if any are independent of this analogy, proceeding without perceptible relation to it, nay, traversing it freely, we may affirm the fact to be true of what are called malarious fevers. These present a variety of types; they are remittent and intermittent, quotidian, tertian, and quartan, with duplications, reduplications, and interchanges, of great complication and intricacy, yet always preserving a well-defined course, and easily unravelled if carefully attended to. The quotidian has much analogy with the ordinary movements of the human system and is hence the type commonly assumed by fevers which attend upon incidental irritations and modes of disturbance, as also in all hectics. A good illustration of this influence is given in M. Brachet's account of the production of an artificial intermittent in himself, by plunging into cold water at a fixed hour, for several evenings in succession.

The tertian departs abruptly from this analogy. "There is," says Watson, "no known bidual habit in health." Perhaps we may fairly regard as an exception to his remark, the habit of alvine evacuation on alternate days, which seems perfectly natural to some men who enjoy good health. But this is unimportant. In some of the lower classes of animals, bidual habits are said to be noted. Knox tells us that in the wild goose, swan, and duck tribes, an egg is laid only on every second day.

We lose all hold upon any normal clue in this labyrinth, when we reflect upon the superposition or accumulation of paroxysms so often observed—the herosthesis of the ancients, the tertiana duplex et duplicata, where each day shall present its access of fever, yet evidently not quotidian, but a tertian repeated, or rather *two tertians;* or one day shall be free from fever, and every other day be burdened with two paroxysms; or, as in the triple tertian, not very frequent, but occasionally met with, I suppose, by every extensive practitioner in malarious countries, where two paroxysms mark every alternate day, a single access presenting itself on the less unfortunate days. For such extraordinary phenomena, so far removed from all correspondence with any normal actions of the organism; for such striking and impressive, and novel effect, we must seek some adequate, novel, and relevant cause.

The quartan, which rarely in our country commences as the original or primary type of an attack of intermittent, is usually considered as most remote from any familiar or incidental analogies. Its history is, indeed, singular. In thirty years of practice in a malarious region, I have met with but two cases beginning with this type; both in young persons between eighteen and twenty-one, one a male, the other a female; both in the better conditions of life, and as little exposed as any residents in such a region could be. In general, the quartan makes its appearance as a degenerate tertian or quotidian. From either of these it is formed in the same mode, that is, by the loss or elision of two paroxysms, upon or after which there commences the new interval or train of progress. The extreme obstinacy of this mode of intermittence, or rather recurrence, is matter of universal notoriety. I saw, in 1817, a case of quartan of fifteen years' duration brought to a close. Some few years since a gentleman placed himself under my care, who had not missed his quartan paroxysm once in eighteen months. The books were formerly filled with such instances; now seldom occurring to shame the profession. The subjects of these tedious quartans are often apparently in very good health in every other respect, stout, robust, corpulent, athletic, with good appetite, sound digestion, and ready assimilation, performing with alacrity all the duties of life, and enjoying all its pleasures.

The connection of the remittents of malarious districts with each other, and with intermittents, is undenied, palpable and undoubted. The analogies of movement presented, vary in different instances; but I believe in general, they will be found to refer to the tertian rather than to any other types, the remittent persistence being attributable probably to some organic change in the condition of some one of the viscera; the abdominal contents being chiefly affected, the liver, it is probable, in the great majority of cases, the spleen almost always, the mucous digestive tissue not unfrequently. Perhaps the same tenacity may be given to the attack which would otherwise intermit, by congestion, irritation, or inflammation of the vascular apparatus, the lungs and their appendages, and the cerebro-spinal axis with its membranes. We can often trace indeed throughout the whole history of a case, a correspondence with the periods of the double and even the triple tertian.

Let us take a cursory review of these facts. Of a certain number of persons residing at a particular spot, a proportion, in many places a large one relatively to the whole, shall be annually seized with periodical fever. The type will not in all be the same. Some will suffer from a fever continuous in duration, but notably and regularly subject to variations in degree of intensity, and in the concurrent phenomena. Others will be assailed daily by a paroxysm, coming on at a fixed hour and subsiding after a certain duration, leaving an interval of freedom from fever for a part of the day. In others this interval will last a whole day and more, only a portion of every alternate day being annoyed with the febrile access; and yet in others still more fortunate, there will be two days of comparative, nay, sometimes apparently absolute health, to one disturbed with fever. It is agreed to ascribe all these diversified attacks to one identical source, of whatever nature, because the types not only occur together under precisely identical contingencies, but they are all convertible and frequently converted; the remittent often subsides into an intermittent, as a stage of convalescence, or, in seeming convalescence, takes tenacious hold as an intermittent; the quotidian and tertian degenerate, as the common phrase is, into an obstinate quartan.

The given locality in which all these things happen, is sometimes narrowly limited, if not well defined; they take place in the genial months of the year; they seem to be relevant rather to season, however, than mere temperature, being frequent in the coolest spring, summer, and autumn, and infrequent or exceptional in the warmest winters.

2. It may now seem unnecessary to press the argument of the inadequacy of incidental causes to originate the marked phenomena of which I have been speaking, but let us consider it for a moment. If we observe the patient beginning to succumb to the febrific influence at noon of the hottest day of summer in a hot climate, we shall find him shivering, with his skin shrunk, corrugated, and chilly, while he complains of the sensation of profound cold, the thermometer standing at 80° of Fahr., or above it. The most ingenious and able opponent of the hypothesis of the existence of a febrific poison, known or unknown, such as we, for convenience sake, designate malaria, Dr. J. Bell, of Philadelphia, regards the familiar variations in the notable conditions of the atmosphere, alternations of temperature more especially, as the efficient causes of the so-called malarious fevers. But in the low countries of the southern United States, where these fevers abound, we meet with them in masses during the warm months of the year, from May inclusive, annually. In most seasons the heat is then protracted and steady, presenting in many of the most sickly localities little variation in the course of the twenty-four hours. The coolest

portion of the whole (the few hours between midnight and sunrise) is spent in bed, in a more or less sheltered condition; and few expose themselves until the temperature is raised by the presence of the sun, and that of the body, by food. For weeks together the heat of the body is not subjected to a variation sufficient to produce a sensation of coolness except in those who sleep in the open air, or those who bathe in cold water. But these are not known to be more frequently attacked by fever than others; nay, the cold bath is by many considered prophylactic, and the black, who often sleeps out of his house, is less liable to be assailed than his protected master. Again, the month of June, presenting a high average temperature, is remarkable for its impressive alternations. Here, we are apt to find the hottest day of the year; here, also, we have some cool weather with annual certainty. The "sheep storm," "the cold week," are familiarly spoken of, as to be usually expected; a change, attributed by one of our most observant meteorologists, I know not how correctly, to a temporary extension of the range of trade-winds along our coast. During this very week (June, 1849), the thermometer has ranged from 54° to 96°, and on one day, from 70° to 92°. Yet June is one of the healthiest months of the year; indeed the bills of mortality in our Atlantic cities will probably show fewer deaths in June and July than in any other two consecutive months. Certainly it is not marked by any special prevalence of periodical or malarious fevers, nor is their number increased during the cold spells to which I have referred.

Further, it is a matter of notoriety, that in the malarious neighborhood of the city of Charleston, S. C., the most bracing and agreeable winds in summer and autumn are those from the east, because, as it is supposed, they bring in a pure air from the ocean. They are moist and chilly, however, and excite catarrhs, and rheumatism, and croups, in children and invalids, but they lessen the frequency of all climatic and periodical fevers. These two sets of diseases seem to be placed in a sort of positive contrast to each other instead of being allied, as maintained by Dr. Bell, who says, that "in the winter a man who gets cold contracts angina, in spring pleurisy, in summer cholera-morbus or bilious colic, remittent or congestive fever; in the fall, intermittent;" and that "periodical fevers are most frequent and violent in climates, and localities, and seasons marked by the greatest contrasts and alternations in the sensible states of the atmosphere." He adds, also, "worse by far than inspiring marshy air in autumn, will be sleeping one night between damp sheets."

Let us inquire, then, where the greatest contrasts and alternations in the sensible states of the atmosphere are found in our own country, and the relation of malarious fevers to these changes. Along the low lands of our southern coast, from the Rio Grande to the Housatonic, these maladies are of frequent occurrence; unfailing in regularity and terrible in violence as we proceed southwardly. They are not met with on the Merrimack or the Connecticut; they prevail fiercely at the mouth of every river opening into the Gulf of Mexico. Now, taking either the annual or the daily range of the mercury, we shall certainly find the thermometrical changes most impressive north of the Hudson.

Of the alternations in barometrical and hygrometric conditions we are not informed.

The country around Boston is liable to more and abrupter variations of temperature, whether we compare those of the several seasons of the year, or the diurnal changes in every season, than the neighborhood of Mobile, Augusta, or Savannah. It should, therefore, upon the theory I am combating, be liable in greater degree to malarious fevers, but it is both comparatively and absolutely free from them. I know not that the island of Manhattan, or New York, differs materially in climate from Staten Island; it is said that the nights are cooler on the latter from the sea breezes. They are almost of the same geological structure and soil, or at any rate there is no strong contrast, but the difference between them of liability to intermittent fever is very great and familiarly known.

Let us again compare the valley of the Housatonic or any other river in New England, with the low lands on Broad or Tiger in South Carolina. I will not speak of Cooper or Ashley, or Savannah or Pedee, whose banks are deadly to the white man in autumn. The sensible atmospheric contrasts are quite as great, nay, decidedly more marked, in the former; the winters of the midland southern country are milder, the extreme heat of a summer noon not greater, nay, not so great; the day no warmer, and the nights by no means so refreshingly cool; yet there we find, with less sensible alternations of atmospheric condition, a constant prevalence of periodical fevers unknown to our northern brethren.

I know no region so perfectly free from these fevers, and, indeed, from all affections enumerated among the malarious, as the beautiful and healthful plateau which lies in Henderson and Buncombe counties, North Carolina, between the Alleghanies on their western slope, and the French Broad River or Saliko. In this earthly paradise, human health is at its highest point, both during the cold of winter and the heat of summer. The soil is fertile along the banks of the river, and the air and water of unrivalled purity. But the climate presents impressive and rapid alternations. However warm may be the genial noon, the nights are always cool. Where, then, should periodical fever prevail if not here, supposing it to be produced by these contrasts? Yet if the whole population of that "happy valley" should sleep in damp sheets, in autumn," not one would be attacked by intermittent or remittent fever. Such an attack has never happened to any resident there, since the first pioneer settlement was made on the expulsion of the Indians. Yet these fevers show themselves there, sometimes, and in their most violent forms too, in persons who travel thither from the low lands of Georgia and the Carolinas on one hand, and of Tennessee and Kentucky, on the other. Contrast this liability from sensible atmospheric alternations, with the risk so well understood in our southern country. If any man of the white race should sleep in the dryest sheets, in the most comfortable apartments of any house, on any rice plantation, in the most balmy summer or autumn night, in our southern low country, selecting the season of most steady temperature and greatest freedom from other vicissitudes, I would not hesitate to insure him, for a very slight premium, an attack of malarious fever. If he repeat the experiment a few times, his chance of escape would be annihilated. I appeal to my southern brethren whether I have stated the facts at all too strongly; the inferences to be drawn seem to me clear enough, that atmospheric alternations are inadequate to the production of the familiar effects, and that certain localities must possess or give origin to some obscure but most efficient morbid agency.

Lastly, the well-known modes of limitation of malarious diseases, to which I have slightly alluded, are apparently inconsistent with the action of "the obvious and patent, the plain and easily found" atmospheric influences dwelt on. For example, the city of Charleston, Savannah, the town of Beaufort, Aiken, the village of Walterborough, Eding's Bay on the sea-shore, Sullivan's Island in the estuary of Ashley and Cooper Rivers, Summerville, and Whitesville, with a thousand other safe summer residences, and "pine land settlements," as they are called, are known to be *absolutely* exempt, or nearly so—*comparatively* so, in the highest expressible degree—from the endemical fevers which ravage our whole southern low country. *Sleep* within well defined precincts, at each of the above named points, and you may indulge yourself, with impunity, in daily rides and walks in every direction around; venture to sleep out of the "charmed circle," and you will be assailed by periodical fever, almost as certainly as you will be vomited by ipecac, put to sleep by opium, or rendered insensible by ether. I cannot admit that the influences which thus act, or fail to act, are by any means "patent or obvious." Some of the points mentioned as healthy are remarkable for their atmospheric moisture; others for the impressive and agreeable contrast which they present in the refreshing coolness of their nights, after burning days of glare and sunshine. This is strikingly true of Sullivan's Island and Aiken; one of which is noted for a high dry air, the other for a very damp atmosphere. Let any one compare them with the upper portion of New York Island climatically, and point out, if he can, in what atmospheric condition thermometrical, barometrical, or hydrometic, consists the difference between them, which renders the latter so much better situated in so many respects, so much more liable, nevertheless, to periodical, malarious, intermittent fevers. Nay, I think it would be difficult upon any "obvious" grounds, and setting aside the hypothesis of a specific poison, to explain the immunity of one end of Manhattan Island and one end of Sullivan's Island, and the alleged liability of the other end of each, to this class of diseases. I have not laid any stress here upon the stories told of the liability of one side of a street or road, one side or one room of a house, nay, one side even of a ship, to these fevers, while the opposite side was free; nor upon the immunity of a ship's crew stationed a cable's length from the shore, while those who ventured after night on land were assailed; nor upon the occurrence of ague in the fœtus; all which rest upon very fair authority, and, if true, are absolutely unaccountable upon any known or obvious modes of causation. The literature of malaria has been made almost as wonderful as that of mesmerism, and all who are sincerely anxious to arrive at the truth should be particularly careful upon what evidence they admit such facts as the above, some of which are probably true, but ought to be more clearly made out, and more strongly confirmed than they yet have been.

The facts, then, which, at the risk of some repetition, I have thus brought together, will, I think, if carefully considered, be found abundantly to establish the position that the cause of periodical fever is a specific poison.

Its influences or modes of development are peculiar and characteristic.

Its phenomena are not explicable by reference to the agency of any known causes.

It is controlled most definitely by the obscure, undefined, and unintelligible action of specific remedies; a point not argued, because universally conceded.

The next step in our discussion leads us to investigate the *nature* of this specific poison; to inquire whether it is organic or inorganic; animalcular or of vegetable growth; an effluvium or a gas.

The ancient theory, "that *moisture* under different states of temperature, acting upon the human frame under different states of the cutaneous functions and muscular relaxation, is to be regarded as the sole cause of intermittent and remittent bilious fevers," is definite enough, and comprises all the points labored by the writers above mentioned. It is easy to show that it is overlaid and encumbered with objections quite as great as those which it is offered for the purpose of evading. The low alluvial lands of Louisiana, free, according to Nott, from these fevers; and her bayous, remarkable, according to Cartwright, for their salubrity, abound in moisture. The same assertions are made concerning the extensive tracts now under drainage by the State in Hyde County, North Carolina, and the Great Dismal Swamp. In the vast extent of country included within these limits, moisture must surely have an opportunity of acting upon the human frame under all different conditions imaginable. If then these fevers are not numerous and vehement there, something else is wanting to their production.

Equally untenable is the contrasted doctrine advocated by Ferguson, that "*paucity* of water where it has recently abounded, is the only contingency necessary in a warm climate, to the production of malarious fevers or their cause." In Africa, as travellers inform us, the very termination of the dry season, the very commencement of the rains, is the precise period at which fevers begin their sway; the influence of the abundant moisture descending through the hot air being felt, as we are told, at once, or in an almost incredibly short time. In our own country it would be idle to speak of paucity of water, either absolute or comparative, in reference to our inexhaustible lakes, ponds, and inland swamps, in the neighborhood of which malarious fevers annually prevail.

Of the electrical causation of these fevers suggested by Murray and others, and the modification proposed by Folchi, usually alluded to as the thermo-electrical theory, in which the whole train of phenomena are ascribed to the combined influences of abnormal calorification and disturbed electrical equilibrium, I shall only say that they are presented to us in too vague and indefinite a shape to justify our admission of them. The vast proportion of the earth's surface affected; the great diversity of soil, climate, weather, and, indeed, all atmospheric contingencies with which the presence of these fevers is associated, preclude the possibility, it would seem, of any similar thermal or electrical states, either of the air or of the bodies of those attacked. Yet the facts accumulated in support of these views are interesting, and may be destined to assume a greater degree of importance in the future discussions of the subject than we can venture to accord to them now.

The *gaseous* nature of the cause of periodical fevers has been ably maintained by Professors Gardner and Daniel, who consider it to be sulphuretted hydrogen. In a very ingenious paper by Dr. Leavenworth, the claims of carbonic acid are strongly set forth, and several of our western brethren are satisfied that the evil agent is nothing but carburetted hydrogen. Not to enter minutely into the controversy, I will merely state that an insurmountable difficulty lies in the way of either of these suppositions, is the great variety of localities and circumstances, geographical and geological, in which we meet with the effects of the alleged cause. We find these fevers on the cold fens of Holland and Lincolnshire, as well as the rich rice fields of the sunny south; on the smiling hills which overlook the majestic Hudson, as well as among swamps and marshes; on the lime rock of Tennessee and Kentucky, the clay of Alabama and South Carolina, the sandy barrens of her northern sister, and the granite and sienite of the Empire State; on the volcanic tufa of Civita Castellana, and the Roman Campagna, and in the very crater and on the sides of extinct volcanoes, as at Bolsena and Milo. If sulphuretted hydrogen be eliminated in an African jungle or on the borders of a sluggish creek in Virginia, whence does it arise in some of the contrasted localities so often enumerated? Why is not fever, on one hypothesis, always endemic at the White Sulphur and Sharon Springs; and on the other, at Saratoga, Seltzer, and Vichy? Why is not the presence of some of these gases always demonstrable in a malarious atmosphere? Having ascertained the poison, why cannot we at will produce with it an attack of fever of one of the known types? In other words, how is it that the observed morbid effects of none of the irrespirable gases resemble any known form of fever?

The following objection seems to me fatal to all the above hypotheses of causation equally and alike, unless when they admit of being resolved into the familiar doctrine of a specific poison. All patent and obvious agencies must produce logically patent and obvious effects. Changes of temperature must make notable impressions on the system; irrespirable gases cannot be breathed without notable inconvenience or derangement of system. But when a poison is applied, it is absorbed and retained, and passing into the organism, finds in due time a reception upon the tissue, or within the fluids it is adapted to affect, if inorganic. If organic, a single dose may be large enough to be promptly efficient, but more generally an interval is required for its increase, propagation, and multiplication. These are principles upon which I need not dwell. Let a subject visit on a pleasant summer evening a field in our southern low, or middle country, especially in the neighborhood of a rice reserve or a sluggish stream, and sleep there; or let him rest under a tent in the desolate plain near the ruined temples of *Pæstum;* he may rise the next morning in undisturbed health, and continue perfectly well for a fortnight or three weeks, and then, without warning, fall suddenly a victim to an overwhelming attack of fever, congestive or inflammatory. To render this mystery if possible still more mysterious, and laugh to scorn all attempts at explanation by an imagined accumulation of carbon in the system, a gradually augmenting determination to or congestion in the portal vessels, the vena cava, the vessels of the spleen, of the cerebro-spinal axis, or of any other organ or tissue—let such a subject, a few hours previous to the explosion of the febrile symptoms, take two or three full doses of cinchona or quinine, bringing on some fulness of the head, some buzzing in the ears or dimness of vision, and he will with as much certainty as anything established in therapeutics escape the threatened attack; or avert a second if he has been surprised by a first, and favored with an intermission. But the counter poison here employed is not known to eliminate or discharge anything from the body by any outlet; we cannot affirm that it promotes the excretion of retained or accumulated carbon, hydrogen, or nitrogen, through either the lungs, the liver, the kidneys, or the skin; and yet it is a remedy infinitely more available than the most active evacuants or so-called depuratives. Nor is it easy to conceive how it corrects the morbid impressions made upon the organism, either thermally or electrically; its influence seems purely antidotal, and implies the previous presence of a definite poison.

We have increased gratuitously the obscurity of our present inquiry by the universal habit of ascribing too much to the agency of a cause whose very existence is matter of inference, however rational and logical that inference may be, and its alleged source and nature altogether hypothetical. Ferguson and Bancroft, and many others, Chervin among them, confound yellow fever with malarious diseases; Cook places typhus here also; and some western writers have not hesitated to include cholera asphyxia in the same category. The ridiculous extension of the list in Macculloch, needs no comment; but I will content myself with stating my belief that we have no right, in this controversy, to refer to any other morbid affections than intermittent and remittent fevers, in which periodicity is the prominent element, and in which the observance of regular type and period can be clearly traced, calculated, and predicted. Even hepatitis, dysentery, and dropsy, so familiarly comprised under this head, should in proper strictness be rejected as at least doubtful; nay, as in all probability the secondary effects of malarious fevers, or the result of coincident contingencies. It is but a single summer since an epidemic dysentery of great virulence and large proportional mortality prevailed over a vast extent of territory, from the lakes and the St. Lawrence to the Atlantic coast; from the Merrimack to the James River; affecting many districts celebrated for their usual healthfulness, and especially portions of New England, hitherto free from the suspicion of malarious impurity, and unconscious of intermittent fever since the incursion of the Pilgrim

Fathers. This disease was almost unanimously ascribed to malaria on the banks of the Delaware and the Potomac; but what shall we say gave rise to it along the rocky shore of Connecticut, or on the cold and barren soil of the interior of Rhode Island?

The strength of the argument in favor of the *organic nature* of malaria lies in the history of the latent and intercurrent periods of the fever which it produces. It is easy to show the failure of the received views to explain these phenomena; indeed all pathological writers feel and acknowledge frankly this defect. Now, if we suppose with Prof. (J. K.) Mitchell, an organized germ of vegetable character introduced *qua data porta*, into the system, we may well imagine that its growth and multiplication will require a certain progress of time, during which its reproduction will augment the quantity of deleterious matter into an efficient dose. We may further imagine, then, either the death of the first generation of fungi, or the elimination of the great mass of them through some of the emunctories, to explain the interval of intermission; and the birth and development of successive generations to render intelligible the long train of tenaciously recurring paroxysms. We may assume, too, that the several types of intermittent are owing to the variety of forms of cryptogamous vegetation, some of which propagate in one period and some in another. This hypothesis is indeed most ingeniously conceived and ably maintained; it is supported by a large mass of facts, to which accumulations are almost daily making, and will apply, as stated above, to a great portion of the history of malarious fever. But it does not entirely escape or surmount all the difficulties of the subject; nay, some remain which threaten to be fatal to it, notwithstanding all the genius and learning which its author brought to its support. Thus, for example, the relations of malaria, be it what it may, are strongly, and as regards its generation and production, exclusively to *place*. But it is just as tenacious in its adhesion to the *person* of its subject; it seizes upon him often after very brief exposure; it enjoys within the animal, or rather exclusively the *human*, organism a congenial habitat where it finds all the material of growth and reproduction, and from which it is dislodged with great difficulty. Except in this relation to person, it is not transferable; it is never transported by any known mode, any variety of fomites, nor when produced in one patient does it affect another by any closeness of propinquity. But if propagated within the body, tenacious of life as it is, how can it fail to pass out through some of the emunctories into the air surrounding it? and if diffused therein, how can it fail to attack a subject just as readily as when propagated or created out of the body? This never happens, however, and if it did happen, would be contagion, or something closely analogous.

Again: if each form of fever requires a fungus of special duration of life and system of reproduction, how can we comprehend the change or transition, so familiar, of one into another; of a tertian into a quartan, for example, or of a simple into a double or triple tertian, or into a remittent, or of a remittent into an intermittent.

And again, the books are full of wonderful stories of the fixity of malaria on certain occasions, though at other times easily wafted on the wings of the lightest zephyr. We read of one side of a road, a street, a house, a ship, being sickly, while the opposite is quite free from fever. These interesting curiosities of malarious literature are as well attested as other wonders of nature, but, as I have already said, require examination and confirmation; at any rate, every one is aware of the apparently capricious action of the cause of periodical fevers, whatever that cause may be. The received theory is the butt of much sarcastic criticism in reference to this matter; but it does not seem to me to enjoy by right a monoply of the taunts lavished on our ignorance of the details necessary to a clear and full understanding of this grave topic. If malaria be fungous, it must either be breathed or swallowed, absorbed by the pulmonary or gastro-enteric mucous membrane, or by the cutaneous surface; for all this it must be diffused in the air. When thus diffused, why does it not cross a road, or street, or piece of water, invading a ship "a cable's length from the shore," or spread throughout a house, a vessel's hold or cabin? Odors and dust are thus spread; smoke and vapors disperse themselves; gases permeate each other; why should not fungi, smaller than some of these particles, larger than others, obey the movement of currents of air in which they are floating?

We must not pass altogether without notice, the animalcular theory of malaria. Among the ancients, Lucretius, Varro, and Columella maintained that the poison of marshes consisted of animalculæ invading the body through the lungs, and perhaps also through the stomach. In modern times, this hypothesis has found favor in the eyes of Leewenhoeck, Monjon, and other microscopists, and was received by Linnæus; nor has it wanted defenders in our own day, of whom we may mention Holland, O'Neale, and President Cooper. I have only to say concerning it that all the facts, observations, and arguments offered upon the subject, leave the evidence still deficient, and merely avail to show the possible truth of the speculation. While these authors ascribe the influences of malaria to living animalcular irritation, the late Dr. Dwight suggests the probability that this miasmatic exhalation arises from the death and putrefaction of the immense multitudes of these minute tribes. We shall refer to this, however, in another place.

Malarial fevers occur with great regularity and in great frequency in many regions of volcanic character which do not present any special abundance either of moisture or vegetation. "The Maremma of Tuscany and the Roman States," says Professor Mitchell, "is high, dry, free from perceptible moisture, and used chiefly as pasture-grounds, which are in no respect unusually fertile or productive. Yet the Maremma, throughout its extended domain of nearly one hundred miles in length, is scourged by the most intense forms of malarious fevers. The Campagna di Roma, so celebrated for its pernicious fevers, is included in the Maremma." These desert environs of the great city are elsewhere described as "a territory entirely of volcanic formation, broken into gentle undulations, quite dry, and elevated considerably above the level of the sea. The vegetation upon its surface is by no means abundant."

In a great number of instances, the sites of old extinct volcanoes are peculiarly unhealthy. Such is the fact with regard to Boccano, a solitary posthouse, about twenty miles from Rome, situated in a sort of valley, perhaps the very crater of an extinct volcano.

Civita Castellana, situated on a high hill, or rather mountain of volcanic formation, is also singularly subject to fevers. Yet there can be no stagnant water in its environs, from the broken abruptness of the face of the country, marked by ravines and rapid streams. The surrounding rocks are of loose tufa, soft, porous, and disintegrated, admitting of extensive excavations on the hill-sides, into which the shepherds drive their flocks for shelter.

In the Grecian islands, similar facts are observed. "The town of Milo," says Emerson, "is situated, like almost all those of the Levant, on a conical acclivity, toward the summit of which its narrow streets stretch up with a precipitancy much more conducive to cleanliness than to convenience. The climate of the Milots is one of the most noxious in the Levant, and the soil being volcanic, is still boiling and fermenting with intestine fires, and constantly emitting the most unwholesome vapors and deadly miasmata. The porous rocks of the hills have been hollowed out like those of Antiphyllus, into numerous catacombs, now occupied chiefly as sheepfolds by the peasantry."

These facts are dwelt upon by Professor Mitchell, in his ingenious and learned volume, *On the Cryptogamous Origin of Malarious and Epidemic Fevers*, as confirming his theory of the source and nature of this febrific poison. And it is impossible not to feel the force of his reasonings. "In the Maremma," he reminds us, "where the volcanic tufa is the basis of the soil, the surface is intermixed with the animal remains of departed empires, and the ordure of cattle is covered with grasses of old pasturages, and is wet with heavy dews. Everything, therefore, conspires there to a fungiferous end. The tufa is fungiferous," a point which he specially labors and fully establishes, by abundant references and statistics.

But still it seems to me a question whether these fungi act by virtue of any specific poisonous quality which they possess, or simply as other vegetable matters, the decay and decomposition of which in large quantity is, to say no more, coincident with the presence of malaria and the occurrence of the fevers ascribed to it.

Certain other vegetable matters have been accused of peculiar deleterious qualities. Rice grounds are always malarious; not only when, as in our country, they are situated on low levels, wet and swampy, and surrounded by stagnant reserves, but in Lombardy as well, where they are irrigated by fresh and running water, bright and potable, brought from the clear springs of the neighboring hills and mountains. The cultivation of indigo has been also supposed in our own country to be invariably unhealthy; and the same has been alleged of the steeping of hemp and flax.

By a contrasted analogy, some vegetation is supposed to exert a sort of antidotal influence to malaria; to prevent its formation, or to neutralize its properties, or counteract its effects. Dr. Cartwright ascribes the remarkable salubrity of the bayous of Louisiana to the presence of the Jussieua grandifolia, which, he affirms, "purifies all stagnant water in which it grows." It is an old notion that the foliage of trees has great efficacy as a defence against malaria. Some consider the obstacle as a merely mechanical one; others suppose that the deleterious effluvium possesses some inherent and peculiar property, by reason of which it is attracted by and adheres to such foliage. Both of these suggestions are probably correct; for the leaves of trees attract dews and vapor, and of course the malaria mixed or dissolved in them: but this is not all. Every kind of tree will thus condense the atmospheric moisture; but it is not always the densest forest growth, nor the broadest and thickest foliage which is most efficiently protective. The pine, with its tall columnar trunk, elevated branches, and linear leaves, opposes less mechanical obstacle to the transmission of air and less surface for the concentration and absorption of dews and vapors than any other of the trees of the wood; and yet seems gifted with healing and preserving virtue in every bough. Every tree, indeed, circulates its peculiar fluids, and secretes and eliminates its specific and peculiar exhalation. No one can be insensible to the exhilarating odor of a pine forest; it does not seem to me unreasonable to believe it salubrious and antidotal as well as balmy and delightful. This view has been recently urged by Dr. E. S. Gaillard as "a reasonable deduction from the fact that ozone is found in the atmosphere contained in a bottle half-filled with turpentine, and exposed to the action of light and air." He infers, that the pines of our southern country thus exert a chemical effect upon the poison of malaria by the production, on a large scale, of the most powerful disinfectant and purifier of the atmosphere yet known. "Ozone," says La Roche, "destroys quietly and effectually the miasma disengaged from putrid flesh; and there is every reason to believe that it acts as efficiently in regard to the cause of fever as to atmospheric poisons artificially produced. Ozone is abundantly formed during thunderstorms, and we know that these purify the atmosphere; mitigating or arresting the spread of fever. It exists in greatest abundance in winter, the season at which miasmal fevers do not prevail, and when the atmosphere is in the greatest state of purity. It has been found, too, that the higher strata of the atmosphere are more ozoniferous than the lower, an effect easily accounted for by the circumstance that those strata contain a less quantity of that oxidable miasmatic matter than the portions nearer the surface of the earth, and that hence, a smaller quantity of the disinfectant substance is consumed. In a word," he concludes, forcibly summing up, "ozone acts like chlorine, by destroying impurities existing in the atmosphere; and if it purifies the air of infected localities, and destroys the cause of fever, it can only do so by destroying or neutralizing a kindred impurity or poisonous exhalation, floating in the atmosphere of such localities."

I have already said that chemists have failed to detect any deterioration in malarious atmospheres. It may be also affirmed that investigations made by other modes than eudiometrical tests have been attended with like results, although there are statements in the books apparently contradictory on this point. Thus we read, in the extensive researches of La Roche, that Moschati obtained by condensing the water dissolved in the atmosphere of malarious places, "a flocculent matter emitting a cadaverous odor." Brocchi found "albuminous flakes" in the dews of the Pontine Marshes. Vauquelin procured "flakes of animal matter" from dews gathered in marshes, and kept six months; and "alkaline salts" from the fresh dew of the same place. Dumas and Volta found "an organic substance" combined with the gases disengaged from stagnant water. Boussingault "demonstrated the presence of organic matter in the air deposited with the dew of malarious places. This matter imparted a dark hue to concentrated sulphuric acid exposed to the miasmata during the night." These facts, admitting them fully, and many similar might be added, still seem to me vague, unsatisfactory, and inconclusive. Nothing is more probable than that all atmospheres contain certain amounts, more or less, of organic matter diffused in a state of minute division, or perhaps actual solution in moist air. Prof. Hume found such organic matter, "whether animal or vegetable it is impossible to determine," as he tells us, but he was inclined to suspect the presence of both, suspended in the atmosphere, and "in the condensed water in localities infected with the poison of yellow fever." Dr. Drake, however, failed entirely to find anything foreign in the moisture collected over swamps and rice fields. Such moisture, carefully condensed, was subjected by him to careful examination by one of the most skilful and experienced microscopists of our country, and to the most exact chemical analysis; but in vain.

How does malaria act upon the human body—and in what mode does it find an inlet into the system? These inquiries are variously answered. Some suppose it to be mingled with food and the fluids of the mouth, and thus swallowed. A majority reasonably believe its principal entrance to be by the lung, whose large surface permits its prompt action upon the blood, which is directly poisoned by its admixture. Yet, while I acknowledge the entire plausibility of this view, I cannot help regarding the skin as the chief inlet of malaria. The several tribes of men are remarkably different in their liability to be acted on by it, and the greatest contrast in this respect is presented by the extremes of color. The white man is not only more susceptible of malarious poisoning, but can never be acclimated or inured by habit to its presence. The black is not only little liable comparatively to the most concentrated malaria, as in his native Africa, but soon becomes altogether insusceptible of its ordinary impression in his permanent residence. Fernando Po is said to be the most unhealthy spot in the world: no stranger, not even a negro from the neighboring coast or island, can visit it with impunity; yet its dark race of natives are strong, and athletic, and healthy. The climate of the African continent generally is deadly to the white man; nor can he even travel safely through the jungles of Asia. Much of our own country is uninhabitable by him except at great risk; nor can he cultivate either rice or sugar, tobacco or cotton, without the aid of the negro. But the latter differs from him physiologically in nothing so strikingly as in the cutaneous integument; its opacity, thickness, and coloring matter, and its oily secretions, are all peculiar and characteristic. I do not know whether any stress should be laid upon the impunity which the lower classes of animals enjoy from malarious diseases. Their lungs are lined by a similar mucous tissue with our own, while their skins are covered with hair, feathers, or scales.

We find the state of sleep especially adapted to receive the impression of malaria, as proved by universal experience. But in sleep, little or no saliva is swallowed; the lungs are not specially active in their function, while the skin is apt to be relaxed and moist, probably engaged both in transpiration and absorption. Such points as we have ascertained concerning the nature, qualities, affinities, and modes of action of this poison, must be carefully studied and made to guide us in our hygienic precautions against its impression. It possesses weight. We, therefore, elevate our dwellings in unhealthy or doubtful localities from the ground. It is well to observe here, the contrast between it and the typhus poison, ochlesis. Alison tells us that in Edinburgh the highest stories suffer most from fever; and Marshal Saxe, who was obliged to protect his soldiers from typhous, not malarial fevers, declares his preference for ground floors to his tents. Soldiers would suffer greatly in malarious regions if permitted to sleep upon the ground. Walls protect also against this poison, which does not readily rise over them, unless carried by a strong wind, which at the same time disperses and dilutes it. A tent, a mantle, even a veil, give some protection. A screen of trees, or thick shrubbery, will defend a house from the miasmata rising out of a swamp or pond, if interposed.

Its affinity for moisture is well known; nay, it is only active in combination with moisture. Hence, the safety of the charcoal burner, and the benefit of keeping up fires wherever exposed, or in the sleeping-room when not exposed particularly. I would, with Brocchi, on this account, lay great stress upon the preference due to woollen garments, to the universal use of which among the ancient Romans, he ascribes the comparative immunity they enjoyed in a climate since become so insalubrious to their descendants.

Partly at least, and not in small measure, would I attribute to the aridity of the soil of our pine lands their remarkable healthfulness. I know that the recorded facts are not uniform in reference to this point; that some very moist regions escape, and some seemingly dry spots suffer; but the general rule is not matter of dispute. Ridges, that allow of rapid escape by running off and by evaporation, are usually safest. The subsoil seems to be of little consequence. Aiken is situated upon a thin layer of sand superposited upon hard clay; but the surface is broken, irregular, and indented; and rains do not remain within sight beyond a very short period. Drainage is a matter of great consequence. It is noticed that a malarious country through which a railroad passes is always improved; this is probably done by the effectual drainage.

Density of population is among the most certain preventives of the production of malaria. In all the cities of this western world, the intermittents and remittents which prevailed at first have been gradually driven out, and are now to be met with only in the suburbs; square after square becoming healthy. Such is the fact in Philadelphia, Charleston, Savannah, Louisville, St. Louis, &c. The result is, doubtless, owing to the combination of many elements of causation. The paving of the streets; the hardening of the surface of yards by artificial means, and their elevation, thus preventing the absorption of moisture and allowing its ready escape; the sewerage or drainage; the constant keeping up of culinary fires; the influence of smoke diffused in the atmosphere; the fumes given off in various manufacturing operations; all these concur to produce the effect.

One of the most singular circumstances in the history of malaria, already noticed, but now adverted to hygienically, is its want of diffusiveness. All over our southern country are scattered healthy points, sea-shore villages and pine land settlements, in which the summer and autumn may be safely spent by the residents on the neighboring plantations. They may visit these febrific spots during the day with a certain prudent reserve, as to special exposure to the sun's heat, or to getting wet, or undergoing great fatigue, or falling asleep; but their nights must be spent within the ascertained limits, which are never or very rarely invaded. It is sometimes difficult to account for the immunity enjoyed by such localities; generally it is explained by reference to the contingencies stated above. The pure air of the ocean, or the terebinthinate exhalations of the pine forest, and its arid floor of clean sand, are substituted for the fertile river bottom or the neighborhood of some swamp, reserve, or morass. The narrowness of the circumscribed area of protection is, in some instances, alleged to be altogether inexplicable and mysterious, as has been stated above.

The *latent period* of the malarious poison differs in different climates and under different circumstances. It may be stated in a general way in these United States, as ranging from seven to twenty-one days, during which interval the subject may seem to be in good health; but for the most part shows some disturbance or discomfort. In Bryson's Reports, collected from the surgeons of the British Navy on the African coast, it is there set at about ten or twelve days. In Ireland Dr. Halpin states the terms of eleven cases, as varying from one month to six, and in one instance to nearly a year after exposure. Upon the failure of the Walcheren expedition, the men who had been affected by malaria in the low countries, continued to fall ill during six months after their return. I know nothing in human pathology more obscure than the question as to the condition of the system and its progressive changes through this period of preparation for disease or stage of incubation, as it has been well termed.

It would seem that occasionally the concentration and virulence of the poison may be such as to occasion immediate seizure, or a very prompt attack. Yet the statements of such occurrences are not very satisfactorily given; and I am inclined to think that there is rarely a case in which the incubation is less than of seven days' duration.

I have said that the specific nature of the poison is strongly to be inferred, from the specific character of the remedy which so effectually counteracts it, cinchona. The argument is still more forcibly pressed by those who regard this valuable drug as an equally efficient prophylactic. I am fully assured that this is as true as it is important; and that the most serious exposure to malaria may be undergone with safety, if, at the same time, and for two or three weeks after, we take care to fortify the system, and, so to speak, neutralize the poison by the administration of proper doses of quina. The last expedition sent up one of the formerly fatal rivers of Africa, has returned, as we are informed, in good health, owing to their observance of many precautions; among which the most to be confided in, doubtless, was the taking of a constant daily quantity of this truly available antidote. "The steamer Pleiade," says a recent journal, "has just returned to England without having lost a single man, white or black. She steamed up the Niger in the beginning of July, and ascended the river Chadda two hundred and fifty miles above all former explorations. The party included sixty persons, and the expedition was in the river one hundred and eighteen days, twice as long as the expedition of 1842, which ended in so fearful a loss of life." Bryson tells us, also, that the health of the crews of the African squadron is greatly benefited by the administration to them of a certain amount of wine every day, medicated with quina.

ENDEMICS—EPIDEMICS—LOCAL EPIDEMICS.

From the earliest date of its records, history contains numerous examples of the occurrence of disease, widely prevalent for periods of greater or less duration both among men and animals; the first known as epidemics, the latter as epizootics, significant terms derived from the Greek. These plagues were more or less limited in their extent, and more or less fatal, proportionally, at different times; but appeared so obscure in their origin and history, and constituted so terrible an infliction, that both priests and poets, as well as the vulgar, were disposed to refer them directly to the wrath of the angry gods, the arrows of Apollo; or to the malignant potency of some imaginary monster, as the Lernean hydra.

Even the more scientific and curious moderns have been foiled by this obscurity, and in regard to a great majority of the forms of general pestilence, seem willing to rest in a profession of ignorance as to their cause and generation, and attribute them vaguely to an undefined and indefinable vitiation of the atmosphere, "an epidemic constitution of the air." Some have sagely laid down the "laws of epidemics," others have ventured to offer certain conjectures or hypotheses as to the nature of this alleged atmospheric contamination. Planetary influence, volcanic eructations, telluric effluvia, and insect or animalcular agency have all been brought forward and advocated, as the sources of this class of diseases. The subject is of high interest, and deserves a more lengthened and closer investigation than my limits permit me here to go through. It must receive, however, all the attention that we are able to bestow upon it.

I shall treat in this connection successively, 1st, of *Endemics;* 2d, of *local Epidemics*, as they are called by writers of recent times; and 3d, of *general Epidemics;* endeavoring, at the outset, to define more precisely than is usually done, the terms employed.

1. By the phrase "an *endemic* disease," then, I recognize any malady which, occurring with special frequency in any one locality in a permanent way, proves the existence in that locality of an agency of a peculiar nature, whether known or unknown, efficient in its production. Thus, yellow fever is an endemic of Vera Cruz, Havana, New Orleans; bilious remittent in all our low alluvial country; intermittent fever in Holland; goitre in the Valais; pellagra in Lombardy; milk-sickness in some of our western districts; scrofula, if we believe Dr. Young, is endemic in Great Britain.

2. *Local Epidemics* have often been confounded with endemics, but are readily distinguished by reference to the permanency of the cause which gives rise to them, whatever it may be. Thus, yellow fever, which at a certain season of the year is always ready to be generated in a fit subject at Havana and Vera Cruz, is occasionally, though rarely, epidemic at New York, Boston, or Philadelphia; in which places, when it occurs, it is often singularly localized and confined to very narrow spots or "infected districts." Typhus fever, pneumonia typhoides, dysentery, may prevail at distant intervals in any community; and even diseases whose contagious power is undenied, as smallpox, measles, scarlet fever, etc., sometimes spread so very generally through a dense population, as to have been regarded in the light of local epidemics. By almost all writers of the last age in Great Britain—Bateman, Duncan, Currie, Haygarth; and by many of the highest authority of the present day—S. Smith, Alison, Tweedie, etc., fevers of the contagious character, are often spoken of under the appellation of epidemic. The cause which gives this wide sway to pestilence is not always present or in action—at least does not always act with efficiency. "The contagion of measles, scarlet fever, or hooping-cough, like that of typhus," says an ingenious author, "is never wholly extinct in any country, yet these diseases only prevail epidemically during particular seasons; it, therefore, becomes a very interesting point in medical physics, to determine the reasons why they spread some years so much more than others. We have met with no satisfactory solution of this curious question. The phenomenon, we fear, cannot be explained, and we must be content in our ignorance to refer it to the influence of what was styled by Sydenham, and the older physicians, "peculiar constitutions of the air," during certain years or portions of years, "disposing the body to take on one kind of disease in preference to another."

We have here a distinct expression of the belief in some occult quality of the atmosphere, having no relation to cognizable conditions, barometrical or thermometrical, not to be detected by our scientific apparatus of eudiometers, hygrometers, or electrometers; and this doctrine has been received as an ultimate and established fact. Sydenham, perhaps, utters the sentiments of the majority at the present day, in referring it to a telluric source. "It proceeds," he says, "from a secret and inexplicable alteration in the bowels of the earth, whereby the air is contaminated with such effluvia as dispose bodies to this or that disease as long as the same constitution prevails, which at length, in a certain space of time, withdraws and gives way to another." Local epidemics, however, are almost always attributable to some obvious cause, whose influence is limited to the situations in which they appear, and may be detected and pointed out upon careful examination of all the concurring circumstances, such as the temperature of the season, the previous and present state of the weather as to dryness or moisture, the stagnation of the air from infrequency of winds or tempests, the prevalence of particular winds of known or special quality, the deficiency, perhaps, and perhaps the superabundance of the electric fluid, the decomposition of vegetable substances by which a subtle and malignant effluvium is produced recognized as marsh miasm or malaria; and, lastly, animal emanation and putrefaction. Of these I have already treated in detail; at present, it suffices to refer to them as causes of the various forms of fever and dysentery, the most familiarly met with of all the examples of local epidemics.

3. *General Epidemics* present some of the most wonderful and unaccountable as well as most interesting events that occur in the history of our race. The sources whence they arise, and the laws which govern their appearance and progress, are the themes of inexhaustible discussion, and are, in many instances, enveloped in perplexing obscurity. They cannot be dependent for their origin upon the local influences which were just now enumerated under the preceding head, for they prevail under every possible diversity of circumstance and situation, not only independently of, but actually bidding defiance to all known contingencies. Such was the *black death* of the fifteenth century, which spread itself rapidly over all Europe, including in its ravages every variety of country and constitution. Such, in our own time, is the malignant Asiatic cholera, that, like the prophet's cloud, "at first no larger than a man's hand," has covered with its dark shadow almost the whole of the habitable globe, and swept off millions into the tomb. Arising in Bengal, it extended itself slowly over Eastern India, invaded the vast empire of Russia, striking many parts of Germany, and adding the last bitter drop to the miseries of unhappy Poland. Nor seas, nor deserts, availed to arrest its career. It depopulated the crowded streets of Cairo and Constantinople, and whitened with the bones of armies of pilgrims the sandy plains which surround the holy cities of the prophet. England and France, enveloped in all the safeguards that science and art can offer for the protection of man from physical calamity, have enjoyed no exemption, and the waves of the broad Atlantic presented an insufficient barrier. The sea-coast and the vast interior of our own beloved country, our lakes and the banks of our majestic rivers, have scarcely ceased of late to mourn its presence; it often reappears or lingers upon the southwestern portion of our continent, and our cities are depressed with the terrors of its repeated and deeply dreaded invasion. Its victims were multiplied fearfully at Naples and in Palermo, and its mortality, everywhere awfully great, seemed more frightful than ever at the foot of Etna and of Vesuvius.

Influenza, or epidemic catarrhal fever, is the most frequent and least dreaded of all this class of maladies. Whatever may be the cause of influenza, it is either endowed with singular promptness of communication, or acts simultaneously at distant points. The disease so familiar to us under this appellation, shows itself with no obvious interval of time, all over the United States, and is affirmed to have occurred at once in Europe, Asia and America.

I am somewhat doubtful whether it is proper to include under the present head, our American epidemic, the pneumonia typhoides, spotted fever, febris petechialis, cold plague, which, beginning in New Hampshire, in 1806, extended in successive winters a gradual progress over the greater part of the Atlantic coast, some of our interior country, and even a portion of Canada, including within its range every variety of locality and constitution.

An attempt has been made by the learned and indefatigable Webster, to trace a connection between the access of epidemic forms of pestilence, and the appearance of comets, the eruptions of volcanoes, and the occurrence of earthquakes. But even if a coincidence in point of time be actually made out by such researches, they will afford us no aid in our ultimate investigations, nor tend to establish on any intelligible grounds, the doctrine of the relation of cause and effect, between these magnificent and terrible phenomena.

Having thus separated these three forms of disease by obvious lines, and traced out briefly the characteristic peculiarities which distinguish them, let us return to our difficult task, and endeavor to ascertain, if we may, the nature of the causes to which they are attributable.

1. Endemics are sometimes clearly owing to the particular circumstances of local situation. New Orleans, for example, built upon a low alluvial soil, soaked with moisture and incapable of drainage, with a turbid river in front, and an indefinite expanse of morass and forest all around her, is destined to suffer all the physical evil which a burning sun, and an atmosphere loaded with every varied product of vegetable decay, can inflict. A poisonous and impure water must generate disease, the character of which will be modified by an infinity of circumstances; but experience soon teaches us what the influence of these is likely to be, and, therefore, what maladies we may expect they are to develope. Similar heat, moisture, and malaria, are said, in our western hemisphere, to bring into existence yellow fever; in the east, hepatic disease; in both, dysentery. It might be difficult to say why yellow fever should not prevail in Hindostan, as it does in South America and the West Indies. Among fevers, some types attach themselves to particular localities, becoming endemic in the strict sense of the word. Armstrong says, "that typhus is perennial, in St. Giles," where he attributes it to the want of ventilation, and extreme impurity of air; it is also endemic in many of the Irish cities, where it is ascribed to deficiency of nourishing food, and often, indeed, called the "famine fever."

We may class among endemics, the "milk sickness" of the western and southwestern districts of our own country, already alluded to, the history of which will by and by engage our attention. The nature of this endemical epizootic is not much more clearly known than its source or cause, both being still matters of unsettled inquiry. So of the bronchocele or goitre of the Swiss, and other mountaineers; the endemic idiocy or cretinism of Sion, and the valleys generally of the Alps, and the pellagra of northern Italy. So of the yaws of the West Indian black, and the Sibbens of the Scotch, the tumid leg of Barbadoes, the trismus of Santa Cruz. But these instances shall suffice.

2. *Local Epidemics* have, some of them, just been enumerated under the head of endemics. It is not every disease peculiar to a given locality, which possesses or can exert the power of spreading itself, at one time more than another. The endemics differ among themselves relatively to their cause and nature. All the febrile are thus capable of occasionally multiplying themselves, with an indefinite promptness and force, limited in extent, however, by the boundary of special local circumstances. In our southern cities, yellow fever may show itself sporadically, affecting a few individuals; and again it may pervade the whole atmosphere and affect all, or a large majority of those liable to it. But there are certain limits which it rarely if ever overleaps. It never attacks adult natives or old residents—it never marches along our interior country. We say then, correctly, it is an endemic, it is sometimes a local epidemic; but in no sense is it a general epidemic. Still more emphatically is it a "local epidemic," when it appears in some of our northern cities, where some still persist to regard it as indigenous, though not an endemic. In New York and Philadelphia, for example, where there is no known class of "exempts," it has occurred in a particular section of the city, designated then as "the infected district," prevailing there with mortal sway, but restraining its ravages within these defined boundaries.

We may use with the same propriety similar language concerning our ordinary bilious remittent, though the special history of the two types of fever be so widely different. Yellow fever is met with here and there, in well defined regions, few in number comparatively speaking, and easily enumerated; it is almost exclusively (I acknowledge some exceptions) confined to the sea-coast and to cities. Bilious remittent, on the other hand, prevails over almost the whole world. Wherever a hot sun, stagnant moisture, and vegetable life are found together, it is endemic; in all such places it is occasionally epidemic; that is, it pervades the atmosphere with unopposed sway, disregarding all favorable or unfavorable conditions of the individuals attacked, all the adventitious aid of transient or exciting causes, all the juvantia and lædentia. But it is never absolutely or generally epidemic. There are some sections of country which it has never invaded, and which are known to be entirely free from its intrusions. These insulated spots owe their exemption, in some cases, to elevation, in some to a happy condition of temperature; in others still, to a fortuitous but blessed purity of air and waters.

I have already alluded to the remarkable fact, that contagious diseases of the febrile character, become thus locally epidemic. With respect to the class of endemics, we may by careful investigation, usually discover some reason why they should at any particular season undergo a notable extension. Thus, in reference to the whole series of maladies which arise from malaria, knowing, as we do, the three constituent circumstances which develop and give them energy, we become aware of their danger, and are able to trace effects to their causes. If the atmospheric temperature be unusually high, or the hot season be unduly protracted; if in some situations where vegetable material abounds, an inordinate quantity of moisture be present, or if by drought or any accidental circumstances, decaying vegetable matters are peculiarly exposed in other situations, we can calculate upon certain results.

But we cannot reason thus concerning the contagious epidemics. We cannot even offer a plausible conjecture why measles, or smallpox, or scarlet fever, or sore throat, should sometimes attack but few members of a given population, and again, when introduced, should spread with a contrasted rapidity so widely. The "constitution of the air," is Sydenham's phrase, and is still used, but without definite meaning, to denote the fact that such diseases are liable to such variations in their history.

We know little or nothing of the *juvantia et lædentia* which may affect the progress of the contagious epidemics. We talk, indeed, of predisposition and of exciting causes, but vaguely and ignorantly. What, for example, can we even guess of the circumstances likely to promote the eruption of the dengue, which in less than six weeks from the date of its invasion, had attacked three-fourths of the population of Charleston. It would require a minute and penetrating sagacity to point out what were the constitutional peculiarities which characterized the small portion who escaped, or what modes of occasional excitement had brought on the disease, in those who were seized with it, not having been exposed to immediate contagion by near approach to the sick. Yet this is the problem we are called upon to solve, and the only solution upon which my mind can rest for a moment, with any degree of satisfaction, is suggested by the history of the class of maladies now under consideration.

Every effect must be traced to a cause; every specific disease must be traceable to a specific cause. Of smallpox, but one notable cause is recognized, the contagion which itself generates; so also of most of the other febrile diseases confessedly contagious, the exanthemata especially. Now, these become sometimes epidemic, and spread widely; the contagious matter, to which alone their attack is ascribable, must in such instances be widely diffused, preserving its efficiency. Here, then, we have something to rest upon; we have comprehended one of the modes of epidemic diffusion of disease, and the obscurity of our subject is somewhat diminished.

Again, let us enter upon the debatable ground, and consider the case of the ordinary fevers of Great Britain, admitted by the majority of writers of that country to be contagious, as well as endemic, and of typhus, universally recognized there as contagious. Few can be found to maintain that these arise exclusively from contagion; the possibility, nay, the frequency of their development under peculiar contingencies, may be assumed, as generally admitted. These contingencies have also the power of predisposing causes, and hence, when they are present, forcibly active, or widely diffused, we can easily account for the epidemic prevalence of these forms of fever. A strong degree of predisposition existing, the disease will be developed by a small dose of the contagious poison; or if circumstances retard and restrain the diffusion of the contagious matter, the second set of causes alluded to will create the disease in several points where they find fit subjects.

Any disease, it would seem, may become epidemic, whatever be its cause or nature. Witness the curious frequency of *coups de soleil* in certain places and at certain times, not referable comparatively to mere high temperature, as at New Orleans in 1854 and in New York in 1853. Cleghorn speaks of an unaccountable prevalence of jaundice at Minorca during one autumn, and I have recorded a similar liability to it in Charleston in 1824, not met with previously or since. In many parts of the United States a furunculoid epidemic has been described. It existed here and in Pennsylvania in 1851—in England in 1850. Paronychia was most annoyingly frequent in Georgetown in 1851, and in Columbia; Dr. Gibbs of that city mentions that in a factory there, employing between 40 and 50 workmen, more than half were affected with it. Dysentery, always met with sporadically in certain districts in which it is regarded as an endemic, and frequently spreading there so much as to deserve the appellation of a local epidemic, has been within the last ten years throughout some autumnal months so widely diffused that we may truly regard it as a general epidemic. In 1848, it ravaged the country from Maine to Texas, and from the Atlantic to the great Lakes; disregarding all observable limitations, and attacking districts of strongly contrasted conditions; the cold rocky shores of Narragansett Bay suffering alike with the wide valleys of the great west or the steaming cotton fields of the south. Whatever was the obscure common cause producing it in these localities, must have been generated from some most extensive sources and in great abundance. There is, it seems to me, an unreasonable reluctance to refer to contagion in such examples. It is the most obvious cause of this sort of extension beyond the range of similar contingencies. It is perhaps not always to be detected or proved to exist, but its existence is surely probable and most explanatory of the difficulties.

In certain limited instances, we may imagine the irritation of animalcular life as accounting best for the phenomena; as in the furuncular and paronychial epidemics above spoken of. Holland and others consider influenza as perhaps extended in this way. In still other examples—as of insolation and jaundice—given above, a certain rare combination of atmospheric elements may have concurred, not discovered or noted at the time and place.

3. The *general epidemics* of modern times are few in number, and may, perhaps, with advantage be studied somewhat in detail. Influenza and cholera stand at the head of the list, as prominently gifted with the peculiarities which characterize this terrible class of diseases;

exciting and spreading over all diversities of soil, climate, and locality, defying all extremes of temperature, and assailing promiscuously all the tribes, nations, and varieties of the human race. Influenza is not properly an endemic anywhere; it often prevails in limited situations as a local epidemic. Its relations to ozone have been of late much dwelt upon. Admitting all that has been said upon this topic, there are still many difficulties unremoved. In hot seasons the atmosphere in not markedly ozonic, yet influenza is sometimes epidemic in summer. Several instances are on record. In July, 1843, for example, influenza raged intensely while the thermometer ranged above 80° Fahr.

Cholera originated, as is well known, in a district of Hindostan, near Calcutta. Whether it is truly an endemic there, I will not say; if it existed as a local epidemic anywhere, its malignant potency soon burst all local restraints. Many of the endemics and local epidemics, indeed, have, from time to time, overleaped their usual barriers, and extended themselves so widely as to deserve notice under the present head. The plague, a contagious endemic of Asia and Africa, has several times invaded Europe, and devastated some of her most flourishing cities. It is somewhat under the control of temperature, and prevails almost exclusively in low latitudes; but even in this matter there seems something anomalous; for, while it has never been met with between the tropics, it has more than once penetrated as high as London and Paris.

Geographical distinctions of a similar nature seem to be observed by several others of the forms of pestilence. Yellow fever, for example, prevails frequently in North and South America, and is supposed to have originated in Africa. In all these positions, it is either recognized as endemic, or assumes the character of a local epidemic. But so far from being absolutely or exclusively controlled by the limitations it seemed thus to have pointed out for itself, it has repeatedly crossed the Atlantic and struck terror into the southern portions of Europe, by a universality of diffusion and a malignant mortality equal to its worst inflictions in climates supposed to be most adapted to it.

Like the plague, yellow fever belongs only to the heat of summer, and is extinguished by frost.

In contrast with them in this respect stands our American epidemic, the febris petechialis of northern writers—the cold plague of our southern country—better known now as pneumonia typhoides. From New Hampshire to Georgia inclusive, and from our inland lakes to the Atlantic, its ravages comprise a great diversity of condition and locality; but it was arrested by the genial warmth of summer, and revived during successive winters, to subside at last, leaving at present but few and indistinct traces comparatively. Lastly, I will refer once more to that strange exanthem, the dengue, whose brief existence, in 1828, occasioned so much suffering among us, with a rate of mortality unprecedentedly small in the history of disease. It is first noticed near Calcutta; in St. Thomas next—whence it spread over several of the West India Islands, and reached this continent in a few months. It died away in early autumn, having affected our southern cities each for a short period. From that time for twenty-two years, though not absolutely extinct, it was scarcely heard of; but, in 1850, it burst upon us again with the same violence and rapidity, and died out after a similarly short reign, disappearing as it did before. It is a contagious epidemic; but of its source no one knows anything. It was conjectured to have been brought from Africa to St. Thomas.

Let us examine, for a moment, the various hypotheses and speculations brought forward to account for the appearance of these forms of pestilence. They have been attributed to heat, cold, prevailing winds, and a variety of other such agents; but it will be readily perceived, on referring to the essays on these points, that the reasonings made use of apply exclusively to certain localities, and must further be acknowledged to be defective and unsatisfactory, even as regards these. When an endemic becomes epidemic, and when a local epidemic overleaps its original boundaries and becomes a general epidemic, this can only occur from a diffusion of the agent which has caused it, and an extension of its poisonous influences. If any such malady, then, appears to prevail under opposite or contrasted conditions of cold, heat, dryness, moisture, and peculiar winds or defects of winds, and obviously beyond the scope of notable exhalations, animal or vegetable, such as are developed by the various sources of malaria, it is clear that we must not attribute it to these limited causes of evil. But it is just such circumstances that constitute the difference between a local and a general epidemic.

Some atmospheric contamination is very commonly referred to in these discussions, but few seem willing to attempt to define it, even conjecturally. There are, for example, several chemical substances capable of assuming a gaseous form, which, when applied to the respiratory mucous membrane, produce an irritation resembling catarrh. Suppose such an aerial matter extensively mingled in the atmosphere, and we should have a species of influenza wherever it spread itself. Such is chlorine, and such ozone; and such are selenium and its compounds, with hydrogen especially. But chemists detect nothing of this sort in ordinary epidemic atmospheres. Whence, indeed, could these products arise? We know of no large chemical laboratories in operation, naturally, except volcanoes, and epidemics are not more frequent or violent in their neighborhood than elsewhere. Sporadic catarrh is, perhaps, the only disease which it is in our power to excite or develop, without the employment of a specific poison. Let any individual sleep in damp sheets, or sit in a current of damp air, or on the ground in a chilly night, and the probability is very great that he will be seized with catarrh. Some persons are affected with it in all changes of weather. Now, the relations of the several qualities of air to each other, especially in its combinations with aqueous vapor, are beginning to be so carefully noted and so much better understood, by chemists and natural philosophers, that I scarcely hesitate to expect a full solution of the frequent appearances of influenza, or epidemic catarrh, from the future and more minute observations of meteorologists. But, as I have said, this disease stands alone.

All the other modes and forms of general pestilence have been alleged to be of contagious character, and, if this point be made out, we can have no difficulty in comprehending their phenomena; for contagion, though more active under certain circumstances, and at some times than others, is capable occasionally of bidding defiance to all understood impediments, and of continuing pertinaciously its destined progress. When we understand better the minute chemical and meteorological changes which take place in the air about us, we shall be able, doubtless, to say why a contagion which spreads rapidly and becomes epidemic at one time, shall, at another, fail to extend itself, except by contact or near approach.

Prout tells us that, having been engaged in a series of nice experiments to determine the weight of a given portion of atmosphere in London, he suddenly found its specific gravity to undergo a notable, though not very great, increase. It was just at this period that cholera invaded the city, and he plausibly enough infers, from the coincidence in point of time, that between this superadded substance—the nature of which he failed to detect—and the terrible pestilence that ensued, there existed the relation of cause and effect. Suppose him to be correct in this, we are still at as great a loss to determine upon the origin of this heavier aerial matter. If any one contends that it was a telluric emanation, I object that the disease occurred above and upon all possible diversities of soil, rock of all varieties, alluvial deposits, clay, lime, black loam, and sand, and that it was even met with at sea, and in Russia, when the earth was icebound and covered with snow.

It would be difficult to maintain the possibility of an identical effluvium under all these varied conditions of soil, place, and temperature. No one has imagined a volcanic source for the cause of cholera. The spot where it commenced is as far as any other on the earth's surface from any known volcano, active or extinct. No earthquake announced its coming; no meteoric phenomena attended the approach of this scourge. In some places it was foreshown, as we are told, by myriads of insects hovering over the devoted heads of its victims; but, if we give all the required weight to these statements, we cannot attribute it to their agency, because, in a large majority of other places, they were not seen—they did not, indeed, exist. In some localities, a sort of warning, it is affirmed, was given of its dreaded invasion, by the increased and still increasing malignity of its connate maladies—diarrhœas, dysenteries, and all other bowel affections. This we do not deny; but it is equally true that, in many other places, its appearance was unexpected, and as sudden as the bursting of a thundercloud. Some of its seats were affected at the time of its access with a variety of malarious diseases, and many, perhaps, were attacked at the usual season of the prevalence of such diseases. This is true of New Orleans, Havana, and many of our western cities; but no one will assert it of Moscow, Hamburg, Paris, or Edinburgh.

If it be proved that a ponderable agent, such as was detected by Prout, is the cause of cholera, why may it not consist of a solution or diffusion of the matter of contagion. It is not ordinary malaria, nor a volcanic nor telluric emanation; some regard it as a cloud of fungous sporules, others as a congeries of animalculæ; no chemical properties are attributed to it, unless we are to believe the stories of the more ready putrefaction of animal matter during its presence, half told indeed, and not proved at all; no sensible quality is ascribed to it but weight, and this must belong to the matter of contagion. Matter may be dissolved and diffused in the air in a state of the most incomprehensible tenuity, and yet preserve the specific qualities belonging to it; a familiar example of which may be referred to in the fragrance of flowers and other odoriferous bodies, and magnificent instances recorded as occurring in 1782 and 1783, when the atmosphere, almost over the whole globe, was filled with a coloring or colored matter, which tinged the sunlight and the moonbeams of a reddish hue, and in August, 1832, when the whole air assumed a greenish tint. These phenomena were, at the time, themes of high discussion, and were by the superstitious supposed to prognosticate wonderful things.

"In the year 1782, and still more in the year following, a remarkable haze spread over the whole of Europe. Seen in mass, this haze was of a pale blue color. It was thickest at noon, when the sun appeared through it of a red color. Rain did not in the least degree affect it. This haze is said to have possessed drying properties, and to have occasionally yielded a strong and peculiar odor. It is also said to have deposited in some places a viscid liquid of an acid taste and an unpleasant smell. About the same time, there were in Calabria and Iceland, terrible earthquakes, accompanied by volcanic eruptions. Its dispersion, in the summer of 1783, was attended by severe thunderstorms. During the above-mentioned year, an epidemic catarrh or influenza prevailed through Europe, affecting not only mankind, but likewise other animals."

The contagion of smallpox, we know, spreads itself at all times a few inches, or a few feet from the diseased body; sometimes fills the chamber of the sick, sometimes infects the air of a whole city. This is the diffusion, locally epidemic of the matter of contagion. Upon what principle does any one venture to deny the possibility of its further diffusion to an indefinite extent? It seems to me fair and logical to follow out the analogies offered us by the ascertained and undisputed facts which have been referred to, and to conclude that a diffused contagion is the true source of this wide spreading epidemic.

The same reasonings will apply to the case of plague, measles, sore throat, scarlet fever, etc., when they spread beyond their usual limits, and assume the character of general epidemics.

Much has been said of the laws of epidemics, but no confidence is to be placed in the doctrines, so positively laid down on this subject. Each individual is *sui generis;* arises, progresses, and is limited in its own peculiar manner. Some, as plague, pneumonia typhoides, and yellow fever, are under the control of temperature; others are entirely independent of such control. Some are confessedly contagious; others are by many writers denied this property, as yellow fever and influenza. Some are endemic or locally epidemic, as typhus—others present in their history no reference to place, as measles and scarlatina.

Among the laws so dogmatically laid down as governing epidemic diseases, much stress has been laid upon their supposed exclusiveness. They are affirmed to "bear, like the Turk, no brother near the throne."

"They drive out," says Rush, "all other diseases, or compel them to wear their livery." If this be a general rule, the exceptions are extremely numerous and striking. Yellow fever and bilious remittent prevailed together in Charleston in 1827, and each of them to an almost unprecedented extent. In New Orleans and Havana, cholera and yellow fever pursued their ravages simultaneously, and, so far as is known, without any modifying influences upon each other. In Smyrna, in 1848, cholera and the plague were epidemic at the same time.

It is affirmed, also, that without any observable change in the appreciable qualities or conditions of the air, they exhibit a regular tendency to their own decay and extinction. "Entering," says an American writer, "like the lion, they retire like the lamb." And this peculiar trait, as it is considered to be, is attributed by some to the influence of habit on the constitution, which becomes accustomed to the presence and excitement of the malignant cause, whatever we may suppose it to be. At any rate, the doctrine, if true, must be taken as the expression of a fact which relates to the condition of the subjects of a pestilence, rather than to any quality or property, or characteristic of the disease itself. There seems to me, however, nothing peculiar in this matter, nor can any general law be laid down which shall include a majority of epidemics. Thus, yellow fever does not usually subside anywhere, until the heat of the season has passed by; typhus continues to rage as long as the favorable or fostering conditions which gave it prevalence are present; measles, hooping-cough, smallpox, etc., as long as they find subjects. If a greater number are attacked when the disease first invades, it is because no means of evasion are attempted for awhile, and because there are a greater number then ready to receive it. But in all the histories of the cholera and the plague, there is a gradual, but not a regular progress, from bad to worse. The bills of mortality of 1836 show the number of deaths from cholera, in Charleston, to have been continually vacillating; nor did it reach the greatest amount until it had been six weeks prevailing. Even then, its subsidence was not regularly progressive.

I have said that I believe "the epidemic constitution of the air" in any given case, to consist in the contamination of the affected atmosphere by the diffusion in it of the material cause of the pestilential disease, whatever that may be.

Thus an endemic or malarious disease may become epidemic, and thus, and in no other way, can a contagious disease become epidemic, either locally or generally. There are many who employ the phrase, infected atmosphere, who carefully repel the suspicion of acknowledging, as to the majority of epidemics, the possibility of a contagious infection or contamination. Let us take an example. The atmosphere of a rice field is at this moment (August, 1854) capable of exciting bilious remittent or intermittent; that of New Orleans or Vera Cruz, capable of generating yellow fever, in a fit subject; that of the fever hospitals of London or Dublin, of generating typhus; that of Palermo or Breslau, of generating cholera. These, then, are "infected atmospheres." Let us, with this contaminated air, fill a ship's hold and cabin, and bring her into the port of Baltimore, Philadelphia, New

York, or Charleston. What is likely to happen in each of these cases? Let experience answer. Any number of persons exposed to the rice field atmosphere, especially if in the state of sleep, will be attacked with intermittent or remittent; the typhus atmosphere will scarcely produce any effect, unless applied for a considerable length of time, and in a deteriorated constitution, depressed either by low living or by residence in an uncleanly, vitiated chamber; the yellow fever atmosphere will not affect a southerner, no matter how his bodily strength may be disordered or impaired, but will attack a northern man in the most robust and vigorous health. The cholera atmosphere will assail almost any one who enters it, but is favored by the same conditions which predispose to typhus.

Again, setting aside all reference to contagion, the poison which infects each of these atmospheres, possesses a separate tendency to adhere to fomites, or to spread itself through surrounding air. This latter property of self-repulsion, so common among aerial or gaseous matters, seems scarcely to belong to malaria; nor is it at all tenacious. If any one enters the rice field air then, supposing him to escape the effects of the poison, he brings away none, and may be approached safely. Thus is its influence limited within narrow bounds. But if a vigorous and robust individual undergo, without injury, exposure to a typhus air, he may, on issuing forth, carry with him, such is its tenacity, in adhesion with his clothes, and forming a sort of personal atmosphere, quite a sufficient quantity to affect any one who may approach him in a condition more favorable for the development of the disease. Instances of this sort have often occurred; thus at the famous Black Assizes at Oxford in 1577, and in Exeter, and in Taunton, and at the Old Bailey, in London, the prisoners brought into court for trial, communicated to the court and spectators the infection from their jail, of a virulent typhus.

As to the tenacity of the aerial cause of yellow fever and of cholera, I do not think it remarkable, yet there are some facts which seem to show that it may adhere to fomites. The quality of self-repulsion which I have said does not probably belong to malaria at all, is certainly very feeble in the poison of typhus. Haygarth, and others, would limit it to a very few feet, yet, as in the instance of smallpox, it seems sometimes to assume wings, and spread with fearful promptness. With respect to yellow fever, the question is hotly disputed, but we must believe its capacity for extension, in other words, its self-repulsive power to be considerable, unless we are willing to pronounce it a disease of very wide and varied origin. It has either arisen or been imported into Philadelphia, New York, New Haven, Boston, Cadiz, Seville, Gibraltar and Xeres, and soon after being noticed at, or in the neighborhood of some infected vessel, or other centre, has pervaded those cities very rapidly. Still more forcible must be the self-repulsion of the cause of cholera, which, from its several centres, rolls on every side its waves of pestilence so diffusively, and, as at Gateshead, near Sunderland, with such incredible intensity and suddenness.

Suppose lastly, then, that the several holds and cabins of the infected ships, above described, were broken open in the midst of the harbor of a populous city, and not entered by a single individual. The malaria of the rice field would continue harmless in its place of deposit; so, probably, would the malaria of the typhus hospital; it is not so clear that the malaria of yellow fever would remain innocuous, nay, if season and temperature favored, it is highly probable that cases of yellow fever would be developed; but I do not entertain a doubt that the atmosphere of cholera would immediately diffuse itself, and excite this terrible and devouring pestilence.

PARASITES—ANIMAL AND VEGETABLE.

All living beings, as far downwards as we are able to trace the history of created things, are subject to the presence of parasites, or dependents, who subsist upon them, and in turn supply a still lower race of adherents with a portion of the superfluous fluids which distend their vessels. This mutual relation is one among the regular ordinances of nature, and, with regard to a very extensive class of parasites, does not seem to do any injury to the organism. Nothing can be more beautifully impressive than one, or an avenue, of our old, rugged, and majestic live oaks, adorned with the graceful garniture of the long "gray-beard," or Spanish moss, the Tillandsia usneoides, which hangs from it without impeding its wide growth, impairing its vast strength, or subtracting from its venerable longevity. And so it is with many other forms of vegetation. Nor do the infinitely dense colonies of small animals—aphis and others—which infest all our succulent plants, in their usual numbers, affect the life or vigor of the vegetation which gives them support. Doubtless, when they multiply beyond their ordinary abundance, they inflict injury; and some are uniformly hurtful. They, therefore, deserve to be considered in this place among causes of disease.

The *vegetable parasites* which infest animal bodies are of the lowest order—algæ and fungi. Fourteen genera of algæ, says Robin, and thirty-eight species, sixteen genera of fungi and forty-eight species, are found in the animal body. They are often found on our common horsefly, on the silkworm, on frogs, in the yelk of a hen's egg. Of *epiphytes*, growing on the human skin and in the bulb of the hair, there are several varieties; they are found in herpes, porrigo, mentagra, favus, pityriasis, and plica polonica. *Endophytes* are found upon the mucous surfaces, as the sarcina of the stomach, and the torula cerevisii; in the mouth, as the algæ of diphtherite and of aphtha, and in the sordes of typhus; in the intestines, as the navicula and the cholera fungi; in the lungs, by Burnett; in the eye, by Hembrecht; in the urine, in milk, mucus, and pus, by many observers; in the perspiration of cholera, by Cowdell and Curme.

Cryptogamic plants have been found on the human skin, in favus, by Remak, Gruby, and Bennett; in mentagra, and porrigo decalvans, or herpes tonsurans, by Gruby; in trichoma, by Gemsburg; on ulcerated spots in the intestines, by Langenbeck; in pityriasis versicolor, by Sluyter and Simon; on the mucous membrane of the mouth, in aphtha (muguet), by Vogel and Gruby; on the coating of the tongue, by Hannover and Bennett; on the fauces and œsophagus, by Hannover; in the posterior chamber of the eye, by Hembrecht; in tubercular cavities and in the sputa, by Bennett and Rayer; in the expectoration of pneumonia, by Remak; in the fluid dejections of typhus, and in dysentery, by Remak; in the evacuations of cholera patients, by Bœhm, Brittan, and Swayne; in carious teeth, by Erdl; in milk, mucus, and pus, by many observers; lining the ear, by Clark.

The question, suggested by Vogel, as to the true nature of parasites is not easily answered. We must inquire into their relations with diseased conditions; if these are constant or uniform, it still remains to know whether their presence is a mere coincidence, or whether they are cause or effect of disease. The yeast plant, which occurs in vomited fluids and alvine evacuations, and in saccharine urine, may be developed, it is said, by lactic acid fermentation within the stomach, or introduced from without in fermenting liquids.

The sarcina ventriculi is also found in matter vomited. Vogel doubts whether it is vegetable or animal—a gonium; its origin and pathological connections are unknown. The fungi found in the meatus auditorius, in the aphthæ of children, or the pseudo-membranes of diphtherites, and in the mucous ulcers of the intestines, are all irregular in their origin and pathological relations. So are those found in the lungs and sputa by Bennett, and those observed in the black sordes of the mouth in the last stage of typhus.

Concerning the *animal* and *animalcular parasites*, there is not less uncertainty. Even when uniform coincidence is established, they may be effect, or merely concurrent, and not causative. Nor is it yet settled how we are to distinguish separate existence in these dependent creations. Houston says there is motion, spontaneous motion, among the granules of the blood-globule. The spermatozoa, which move spontaneously, are not yet assigned a definite place. Klencke calls the cancer-cells "semi-individual." The hydatid! Owen says it is not an animal. It seems endowed with individual organization, and is not vegetable. Is there an intermediate condition, to which we shall assign also the blood-disks and spermatozoa?

I leave the question of origin—of spontaneous or equivocal generation—to the scientific naturalist; finding for myself no difficulty in the belief that either of the opposite conclusions may be arrived at without disturbing our religious or philosophical opinions.

Of external parasites (*ectozoa*), several are enumerated by writers. The acarus psoræ is familiarly known. Vogel, somewhat inconsistently with his general views, regards it as the cause of the cutaneous disease with which it is associated. But psora may be generated, apparently by filth, under insulated conditions. Its contagion, too, may be preserved in and by fomites indefinitely. It is not clear that the animalcule can thus continue to live, dried, on cloth or in a glove. Wilson tells us that, though this species is peculiar to man (it seems to be identically the same in the lion), the genus is of universal distribution among animals. "Ours," he says, "is a beautiful and perhaps elegant creature!" The acarus folliculorum is described by him also, after Simon, as "inhabiting the oil tubes of the skin, about the nose and face, whenever there is an undue accumulation of their contents." He thinks they are of use in stimulating the tubes to get rid of this accumulation. This genus he has also found in the dog and horse. The morbus pediculosus is now almost unknown, yet we have it on the authority of Rabelais that "Herod the Tetrarch died of it, and, before him Lucius Sylla, Pherecides, the Syrian—the preceptor of Pythagoras—and the Greek poet Alcmæon." Two species of pediculi are still occasionally troublesome—the pediculus pubis, and the pediculus tabescentium—sometimes so annoying in the last stages of phthisis, and other chronic and wasting disease. I am not inclined to class here, as some writers do, the pulex, tick, chigo, musquito, gnat, and argal persicus.

Of *entozoa* (internal parasites), there are great numbers, and in great variety of forms and localities. Every solid and every fluid of the body has its tenant. In the muscles we have the trichina spiralis, elliptical, whitish specks, cysts containing a minute coiled-up worm, one-twentieth of an inch long, found in bodies dead of cancer, tubercle, aneurism, and diarrhœa; sometimes, as once in the tongue, associated with a diseased condition, and at other times, as I once saw it, scattered through the muscles of the limbs of a subject who showed no marks of any morbid change attributable to it. In the blood, animalculæ have often been discovered. Klencke ascribes to their presence certain periodical attacks of vertigo. Mongrand, in examining the body of a convict at Brest, detected, in the left saphena vein, a hematozoon, two and a half inches long and four-fifths of an inch in circumference, cylindrical, brownish-red, with an ovoid head as large as that of a middle-sized pin, whitish, and terminated by a sort of black beak; a narrow neck, about one-third of its length, was marked by whitish spots. Delafond and Gruby report that, in the examination of the blood of 2,970 animals, they have found hematozoaires in 20 domestic dogs, 35 crows, 16 common frogs, and 1 earthworm. In the blood of certain dogs there inhabits continually a hematoid entozoon belonging to the genus filaria. Accidental hematozoa may be found, they say, in the vessels of man and other animals; these are foreign to the blood, and do not circulate with it. The hydatid, acephalocystis endogena, detaches its gemmules from its inner surface; one thus inclosing the other in a series, like pill-boxes. It is found in the liver, kidney, womb, etc. "The transition of hydatids into deposits resembling tubercle," says Vogel, "and concretions, long since attracted so much attention that some inconsiderately have regarded all tubercles and concretions as proceeding from hydatids. Lallemand says that he has perceived voluntary motion in the acephalocysts of the human subject. Klencke states that he has frequently propagated them by inoculation." Yet both Owen and Vogel speak doubtfully of their animal individuality. The ascaris vermicularis and ascaris lumbricoides are the most familiar of intestinal worms—so common that many physiologists believe them to be portions of a healthy organism, and only injurious by inordinate number, and under morbid conditions of the system. The tænia, fortunately less frequent, is still, unhappily, not a rare occupant of the digestive canal. There are two species; one of which infests the Russians and the Swiss; the other, easily distinguishable, annoys the Teuton race, the English, Dutch, and Germans. The tricocephalus dispar, still more common, inhabits the same canal. It became singularly frequent, Lanza tells us, during the prevalence of cholera at Naples.

Besides the above, Owen enumerates many which we may consider in the light of pathological curiosities. Of these, the echinococcus hominis is found in the liver and spleen; it is an encysted, ovate animalcule, whose relations are unknown. The cysticercus cellulosa is found in muscle, brain, and eye; it is composed of a head, neck, and vesicular cyst. The polystoma pinguicula was found in the ovarium by Treutler; and the filaria bronchialis—a slender creature about an inch long—discovered by the same author in the enlarged bronchial glands. The filaria medinensis—guinea worm, dracunculus—is of indefinite length, from a few inches to a foot or two. It is very slender and delicate, inhabits the subcutaneous cellular tissue, most frequently of the lower extremities. I have seen it gradually extracted from the leg of an African, by fastening a loop of it upon a quill and rolling it upon this, with great care, day by day. It is very troublesome to the negro race in some localities, as we are told, in Bermuda among others. The filaria oculi humani has been repeatedly found in the eye and in cataractous lenses, three-fourths of an inch in length. The spiroptera were detected in the urinary bladder. A strongylus gigas was taken from a human kidney of the prodigious length of three feet, and in thickness one inch. The dystoma hepaticum, liver fluke, is of ovate shape, elongated, flattened; it is found, though not often, in the liver and gall-bladder.

Beauperthuys and Roseville assert that they have uniformly detected animalculæ in cancers, to which they ascribe the disease: "Erroneously," says Vogel, "even allowing that infusoria do occur as incidental parasites in cancerous ulcers."

Vibriones are found in chancre pus. Donné is inclined to regard them as the cause of lues venerea; but Ricord denies this, because bubo-pus, containing no vibriones, is also contagious.

Donné and Ehrenberg describe an infusorium, trichomonas vaginalis; Ehrenberg thinks it an acarus. In the vaginal mucus of syphilis, Gluge and Vogel look upon it, not as an animal, but as uterine epithelium.

An acarus dysenteriæ is described by Linnæus as the source of the malady; but it is not spoken of by recent microscopists.

Reese tells us, that he saw innumerable animalculæ in the recent black vomit, from a yellow fever patient. They have not been met with since.

Scirrhus, fungus hæmatodes, encephaloid, and tubercle, are classed by Prof. Lanza, of Naples, as fitozoid or parasitic. But this view of the subject must be considered, at present, entirely hypothetical.

SECTION III.

SEATS OF DISEASES.

HUMORALISM AND SOLIDISM.—It was once considered a matter of great importance to discover the point of earliest or primary morbid change in the invasion of disease, and indeed the determination of this question would even now gratify a rational curiosity, and might tend, as all knowledge does tend, to the improvement of our therapeutics. But the vehemence of discord between humoralism and solidism may be said to have exhausted itself. Pathologists are content to explore and detect the variations from a normal condition presented both in the solids and fluids, and are well aware that all of them are liable to morbid change.

The fluids of the body preponderate very considerably, being as some physiologists calculate, in a ratio to the solids, as nine to one. This estimate seems to me, however, somewhat exaggerated.

The discovery of incipient change is probably, in a great majority of instances, impossible, and out of the reach of our inquiries. It can hardly ever be palpably manifest. Even with all the aids of scientific apparatus, it must have progressed greatly before our senses will apprehend it. But we may be led to a very satisfactory inference concerning this matter, by certain familiar considerations. From the great storehouse of the circulating mass of blood, must be built up all the solid tissues of the body—must be formed all the secreted fluids—must be separated all the excretions properly so-called. But the blood itself must, in its turn, depend for the integrity of its composition upon the action of the tissues, whose condition is of necessity a modifying element. The ultimate source of their functional power, their special capacity we trace to the influence upon them of the great nervous centres. The primary seats of the vitality of the different portions of the entire animal structure, are the sensorial and circulatory systems. Every part of every tissue depends immediately upon its nerve and the blood sent to it, for its life; and these, the nerves and blood, are mutually dependent upon each other. Each atom which is gifted with life must receive it from nerve and blood. The particles of dead matter taken as food must undergo conversion, "transubstantiation," as Agassiz calls it, in the formation of the embryo; must become living; must be in this most mysterious manner changed and assimilated, before it can become part of a living organism. The original act of creation is not, to my mind, in any degree more obscure or admirable.

But both the blood and the solid tissues are liable to impressions from without, which materially modify their condition; the former may be directly poisoned by the entrance into and admixture with it of many injurious agents, some of which may be detected and exhibited. It is often indirectly poisoned by the influence of contingencies which prevent the elimination of such effete matters as must be got rid of to keep it in a normal condition. We have reason to infer the existence within it of injurious ingredients, whose presence we cannot demonstrate, by the ultimate results. The blood may thus become, so to speak, passively diseased.

The solids, too, may be acted on mechanically, or chemically, and disintegrated or broken down. But a diseased condition in any solid tissue implies activity, a reaction, as it is called, which may vary indefinitely with the varying nature of the agent that causes it. The capacity for such reaction depends absolutely upon its nervous and vascular connection and supply continuing uninterrupted, and hence we are led, I think, inevitably to the conclusion that the blood and the nervous tissue are the primary seats of disease.

HÆMATOLOGY has only recently been definitely studied and taught. The blood is found altered in disease: 1, by a change in the proportion of its constituent elements; 2, by the addition of foreign matters. I offer a few examples illustrative of each mode.

1. The serum of the blood exists in undue quantity in anæmia and chlorosis; it is greatly below the proper standard in cholera asphyxia. The fibrin increases proportionably in the phlegmasia generally, the blood becoming buffy; in fevers it is defective, and in purpura and scurvy. The globules increase proportionably in leucocythæmia, and as some affirm, in plethora generally; they are deficient in anæmia. The salts of the blood are greatly defective in malignant cholera: when any secretion or excretion is checked or much diminished, the circulating blood contains, in accumulating excess, its constituent elements, of which the chief are carbon and nitrogen: under certain circumstances, the sugar formed by the liver remains unconverted; when the functions of the kidney are impaired, there is excess of urea; when the biliary secretion is suspended or obstructed, there is excess of cholesterine, and the serum is colored yellow. The whole mass becomes black and carbonaceous if respiration be impeded but for a moment.

2. A great variety of foreign matters may be absorbed into, mixed with, and detected in the blood. Kramer found in it silver, after the nitrate and the chlorate had been taken. Œsterlen discovered globules of mercury in it, as well as in the saliva and urine of persons who had been taking mercurials. Heller found iodine and bromine in the blood of patients to whom these remedies had been administered. Nitrate, hydriodate and carbonate of potass, antimony and carbonate and sulphate of iron have been found in similar circumstances. Quinine may be discovered in the urine, which it must reach through the vessels; and lead is shown in the gums and in the brain of those poisoned by that metal.

The foreign matters, which as causes of disease enter the blood, are not always, however, to be thus exhibited by chemical tests and reagents; but their presence can be inferred as indisputably, though less palpably. Inoculation with the blood of a diseased will infect specifically a healthy subject; as in the instances of smallpox, scarlatina and measles. By transfusion of blood, Coleman thus conveyed farcy. Dr. Namias, of Venice, inoculated animals with blood from cholera patients in a state of collapse, thus destroying them in a manner which rendered their blood again destructive to others of the same species. The same is affirmed to be true as to the blood of typhus patients.

Blood thus poisoned, becomes in its turn poisonous. The glands are irritated by it, and the secretions and excretions become morbid; the sugar excites the kidney into diabetes; the carbon and urea oppress the brain into coma. Its chemico-vital relation to the tissues, undergoes essential change, and its osmotic force occasions infiltration and exudation, congestion, dropsy, hemorrhage, and all the profluviæ. It ceases to be nutritious, and atrophy and marasmus follow; or its nutrition is perverted and morbid, and we have then heterologous hypertrophy, or degeneration, fatty or granular, or deposition of scrofulous, tubercular, typhus, or cancerous matter.

There are certain morbid phenomena which seem absolutely independent of all cognizable alteration in the derivative condition of the tissues or the composition of the fluids, and which exhibit forcibly the direct influence of causes of disease upon the solids—the sensorial system most emphatically. A blow upon the pit of the stomach is often immediately fatal in this mode; so may be what is called concussion of the brain. Syncope ensues from some species of pain and from mental emotion, occasionally giving sudden death. Spasm of mortal intensity and the most horrid convulsions may thus arise with the utmost promptness. These derangements are in the strictest sense of the term, functional, and leave no trace of any organic alteration whatever, occasioning no change of composition or structure or arrangement of parts.

We must not omit to remark, in conclusion, that these vascular and sensorial disorders tend almost inevitably by their continuance to produce each other, and thus often occur inextricably intermingled. The most purely functional disturbance of any part, on account of the intimate connection of its nerves and vessels, must tend, if protracted, to derange its local circulation, and thus give rise to alteration of organic structure. Light, too intense or long continued, in its application to the eye, will produce ophthalmia. Palpitation of the heart, too often renewed by mental emotion, will excite cardiac disease of varying character—aneurism, or angina pectoris, or osseous or earthy deposit. Sir B. Brodie having, for experiment's sake, passed a thread through the par vagum of a rabbit (like a seton), found all the parts supplied by that nerve, shortly after, in a state of high inflammation.

On the other hand, all changes of structure, whether of inflammatory or other character, and all vitiations of the circulating fluid, will occasion diseased sensations, and prevent the performance of the specific offices of all the organs, whether secretory or of special sensitive function. Nay, some of them give rise to the most violent and pervasive nervous disturbances, tetanic, convulsive, and maniacal.

DIAGNOSIS.—The knowledge of the seat and nature of any disease, which, of course, implies the ability to distinguish it from every other, is technically termed Diagnosis. A few words may be said here upon the general subject; the discussion, in detail, of particular characteristic symptoms, such as belong to and indicate the presence of each separate malady, must be deferred, to be hereafter dwelt on.

Diagnosis may be looked on as *general* and *special*. It is general when we merely determine the form of disease, and give it name and place; it is special when we individualize the case before us, and ascertain all its elements and complications, whether arising from predisposition or accident, and take into consideration the modifying contingencies. From the first we draw our general, from the second our special *prognosis*, in great part; both are requisite to guide our therapeutic.

Diagnosis may be distinguished farther into *scientific* and *empirical*. The former has advanced greatly within a few years, and deserves to be closely studied and carefully applied. By physical examination, auscultation, percussion, the use of the speculum, the microscope, and by chemical analysis, we now learn much more of the true nature and seat of diseases than was formerly possible. Yet with all these means, we must not neglect the empirical signs which betoken to the experienced observer certain coincident conditions.

Scientific or rational diagnosis often affords examples of interesting and beautiful logical induction. Pain or malaise is perhaps the most universal symptom of disease, a careful observation of which will, in a vast majority of instances, afford us abundant light as to the situation of a disturbed organ. We must, therefore, watch attentively its varied modes of expression, as there are numerous instances in which we must not expect—as from infants, malingerers, deaf-mutes, and the like—to gain information from the subject, in ordinary language. Here, physiology offers us her valuable aid; and, by due inquiry into the condition of the several functions, ascertains for us the state of the organs engaged in their performance. Yet we must not confide too hastily in the improved modes of investigation, as they are professedly progressive. At each step, a new and strong expectation of benefit is justly excited. Under certain circumstances, crystals of oxalate of lime are seen in the urine, and a new disease, oxyluria, is designated. Farther examination renders doubtful this hasty conclusion. There is still a warm and unsettled dispute going on as to the microscopical diagnosis of cancer. The tubercular corpuscles found in the sputa on examination, some affirm to be diagnostic of true phthisis; while others deny their very existence. To-day, Garrod tells us that gout can be set apart from rheumatism with chemical accuracy; the fluids in the former being rendered morbid by an excess of uric acid in the blood. The latter is supposed to be characterized by similar vitiation with lactic acid. Thus we are instructed that scurvy pathognomonically consists in a defect of potass in the system. Tuberculosis is alleged by some to depend upon a want of the earthy salts, especially of the phosphate of lime; others find in it a close relation to fibrin; and others still, to fatty degeneracy. These examples might be greatly multiplied; but a few suffice for our purpose. I remark farther that these modes of diagnosis have not as yet assisted greatly our *prognosis*, and have been of but little avail in aid of our therapeutic. It must not be forgotten that some subjects sink promptly under degrees of change and disorganization that scarcely shorten the lives of others. Nor can we yield ourselves to the guidance of the chemical pathologist without distrust, when we reflect that hitherto his suggestions have made no large addition to our resources, and consider his liability to error. Sugar, the presence of which was once regarded as exhibiting always a specific and serious morbid condition of the system, is now known to be a normal product of the liver, and is said to be always found in the urine of the aged.

Empirical diagnosis still holds an important place; although it is to rational and scientific inquiry that we are bound to pay the greatest and an increasing attention. Our reading and experience will afford us numerous examples of phenomena found to be indicative of conditions, their relevancy to which is unknown or very imperfectly understood and conjectured. It is in this field of investigation that the patient laborer is destined to be rewarded by the most gratifying and useful results, in the conversion of the obscure into the intelligible, of the doubtful into the clearly ascertained. An elaborate research must be made into the sympathetic relations which connect and control the whole organism, guided by a wide and careful employment of the extensive records of experience. We thus learn many things as facts, ultimate facts in the present state of our science, which we cannot explain or account for. We do not understand, for example, why the pulse at the wrist should be small and contracted when the mucous membrane of the stomach and intestine is inflamed, but full and bounding, when the same membrane lining the respiratory tube is in similar condition; yet this difference between the pulses of gastritis and bronchitis has been known from time immemorial. It is not clear to us why thoracic hemorrhage should be attended with a quick frequent pulse, and cerebral hemorrhage by a slow, full one; nor why the pulse should intermit so remarkably in some cases of hydrothorax and hepatitis, and in other cases of the same affections should not exhibit such intermission.

The sympathies excited by the derangements of different tissues vary exceedingly, being modified by the nature of the derangements directly and indirectly. We do not expect from an inflammation of the parenchyma of the liver the same general symptoms connected with that of its peritoneal covering; nor shall we see "animal life so much hurt," to use a phrase of John Hunter, by the inflammation of the external serous tunic of the stomach as by that of its internal mucous coat; although, perhaps, the former may be quite as grave and dangerous as the latter. Now it is plain, that all the parts of which a complex organ is made up may be simultaneously diseased;

and when this happens, we shall find it in a corresponding degree difficult to unravel the complex, and apparently confused mass of symptoms sympathetically developed, unless we apprehend the sources of this confusion. We shall in this embarrassment be apt to be led away too from the actual seat of disease to other and distant points. Headache may arise solely from the presence of crude ingesta or other improper contents in the stomach: vomiting, as in sea-sickness, and after a fall or blow on the head, from some mere disturbance of the brain; or from some offence given to the organ of sight or smell; convulsions from the presence of undigested food or of worms in the alimentary canal: coughing and vomiting from hardened wax in the ear, or from verminous irritation—or from hepatic inflammation, which also unaccountably arouses an unexplained pain at the top of the shoulder, usually but not uniformly attendant on it. I might add indefinitely to this catalogue of irregular sympathies, but I have said enough for illustration.

The usefulness of PATHOLOGICAL ANATOMY, the examination of bodies dead of disease, deserves to be carefully considered in this relation that we may know what is properly to be expected from it, and thus meet with no disappointment. It teaches us definitely, clearly, and certainly, what are the last textural changes in any observed series; and it is not easy to appreciate the full value of such knowledge. We thus learn the tendencies of all diseased conditions; by repeated observation we discover the gradual widening of the circle of morbid influences; by collation and comparison we distinguish transient phenomena which leave no trace, from impressions which stamp permanent alteration. We are taught where to look for dangerous determination, and the proper methods of evasion are thus sometimes suggested. The kind of change too may be detected, and valuable hints for prophylaxis and cure be deduced. But it is needless to dwell upon truths so obvious and palpable.

There are, however, many exceptions to the availability of this post-mortem method of diagnosis. There is a very large class of, so called, functional affections, of which it offers no history. "The body has all the composition it ever had," to employ another terse phrase of Hunter; no discoverable change is seen in the blood or the tissues. We know during life, that in certain subjects there is a prevailing tendency to particular modes of suffering, which we speak of as "diatheses," such as the gouty and the strumous diatheses. We also notice in many persons peculiar liabilities to be morbidly affected by agents which usually impress no morbid influence whatever. These we have already spoken of as idiosyncrasies. In subjects of such diatheses or idiosyncrasy, "the qualities and endowments of one or more organs must be essentially different from those of the same parts in the vast majority of mankind." "Yet there is not the least reason," says the latest of our authorities on Pathological Anatomy (*Jones & Sieveking's Manual*, p. 36), "there is not the least reason for supposing that by any scrutiny we could detect any structural difference." Even when we discover the cause of death, we are often foiled in the inquiry whether the lesion is essential or incidental. Fever of a particular type presents in a very considerable proportion of instances a certain well known intestinal alteration; but this is not absolutely uniform, failing to present itself in some, if not a majority of the fatal cases. In bodies dead of fevers generally, we have detected nothing instructive or available. We see effects only, effects of diseased action, all commingled together—essential, incidental, and accidental. In the great malarious remittent of our country, a change in the color of the liver is affirmed by one, seen occasionally by others, unperceived by an equal number. In yellow fever, Louis depicted a change of hue in the same organ, which, indeed, I believe to be peculiar, but which is so far from being characteristic, that it does not occur in many of the best marked examples of the disease.

The brain of an insane person is generally found to have undergone marked alteration, but not always. "Esquirol, indeed, having examined the brains of many hundreds dying insane, was led to the conclusion that no cerebral changes had been observed by him in such cases, which were not also to be found in others where no insanity existed." I need not, however, press this point farther. After all the deductions to which I have referred, it is still proper to say, that such is the importance of this mode of inquiry, that it ought never to be omitted when practicable; that its careful performance should be regarded as a duty, and that, on the whole, we can have no hope without it, of progress in scientific medicine.

SECTION IV.

PHENOMENA OF DISEASE.

THE phenomena of disease demand in every case the most assiduous attention. By proper study of these external manifestations of internal derangement, by careful collation of and inference from them, enlightened by the records of similar examples, and familiarity with the tendency displayed and ultimate results to be dreaded, as shown by pathological anatomy, and in no other way, are we led to the accurate appreciation of the nature and treatment of the long and diversified catalogue of human maladies.

Considered practically, as some physicians insist, diseases are in fact nothing more than mere collections of symptoms or phenomena. These divide themselves naturally into two groups, the *objective* and the *subjective:* those are objective which the physician may himself observe, apprehend, and estimate; those subjective, the existence and degree of which he can learn and know only from the patient.

It should be our constant effort to enlarge the extent of the first series, and to render the inferences from them more clear and precise. In many cases we are forced to depend on them exclusively: as in the diseases of infants, idiots, and suspected malingerers. In others, we are thrown almost entirely upon the second series for information, as in neuralgia and similar affections, of which pain is the principal element.

Selecting some of the most prominent and frequently recurring of these morbid phenomena, I shall discuss them briefly, endeavoring to assign their cause or rationale where it is known; while I shall frankly acknowledge my inability to trace it in numerous examples. But even in regard to the latter, we shall derive some advantage from the announcement and description of events and changes and their relations, although we may be ignorant of the link which binds them together. We learn much, not only of diagnosis but of prognosis also in this way. Experience clearly teaches that the tendency to death or to recovery is foreshown with certainty by a specified occurrence of symptoms in familiar cases of disease; in many others, if not in all, such an observed concurrence affords reasonable ground for the prediction of a fortunate or fatal issue. Nor is there anything in the course of a professional life which inspires more confidence in a practitioner than the general correctness of his prognosis.

I proceed to sketch these tokens of disease in succession, commencing with the

1. CIRCULATORY SYSTEM.—The sympathies which connect the great central organ of the circulation with the other portions of our frame would seem to be not only almost universal, but obscure and capricious in the highest degree. Thus, while every passing emotion of mind will agitate the heart with violent tumults (*quam facile mille res turbant!* exclaims Celsus)—decapitation scarcely affects it, provided respiration be artificially continued; and the whole spinal cord has been gradually sliced away without notably deranging it.

Palpitation—a convulsive, interrupted, vehement beating of the heart, always occasions great anxiety to the patient and his friends. It is sometimes absent or slight even in serious cases of cardiac disease, and at others urgent or troublesome; where careful exploration during life and minute examination after death have failed to detect any lesion or change of structure. It is but the other day that I assisted at the autopsy of a distinguished person, whose fatal malady had been pronounced by at least three skilful physicians, after due investigation, a decided organic affection of the heart; there was not found in the organ the slightest perceptible deviation from a normal condition. The symptom sometimes connects itself with dyspeptic suffering; sometimes with mere morbid nervous susceptibility; often with anemia, and still more frequently with varied thoracic derangements. Intermittent action of the heart is a curious phenomenon, whose relations are ill understood; nor do we even know why it is not always syncopic, as it sometimes is. There are at least two remarkable cases on record, in which it seemed directly or indirectly under the control of the will. An indirect power over it through the respiration is exerted by many persons.

The *Pulse*, with all its obscurities and anomalies, will always offer to the physician one of the principal modes of appreciating the actual condition of the organism in its diversified states of disease. It may be defined as the tactual impression made by the impetus of the current of blood through an artery of notable caliber. It is constituted and modified by the following elements: 1. The condition of the great central organ, the heart; 2. The condition of the circumferential organs of circulation—the capillary systems, general and pulmonic; 3. The condition of the intermediate tubes, arterial and venous, as to contractility and tonicity; 4. The composition of the circulating fluid; 5. The condition of the sensorial centre. We may lay it down, too, as a general rule, that diseased actions in all the other systems affect more or less the circulatory.

That we may clearly distinguish morbid from normal phenomena, we must study attentively the pulse in health, which, as I have already said, is easily and often disturbed; and ascertain and learn to appreciate such variations as do not imply actual present disease.

The pulse of health is *regular;* that is, the rhythm of its motions is exact and its intervals equal; it is *vigorous*, sufficiently forcible to give the idea of gentle distension, and yet soft; resisting with a determinate degree of elastic firmness, yet yielding to moderate pressure; it is *full;* that is, the artery is completely dilated, yet not unduly tense, or cord-like. The average pulse of the adult beats about seventy strokes in the minute; the dilatation of the artery which gives the tactual impulse, corresponds with the systole of the heart, and like it occupies a definite, appreciable portion of time, without hurry or abruptness, but gradually and smoothly, yet not slowly or hesitatingly.

A morbid pulse may be readily described by comparison, then, as follows: It is strong or weak—hard or soft—tense, chorded, undulatory, vermicular; it is abrupt or jerking, quick, sharp; it is frequent or infrequent; it is slow, labored; it is irregular in force and in interval: it is intermittent, regularly or irregularly.

We must never forget the due allowance to be made for the contingencies that modify the pulse normally or physiologically. The pulse of the infant is very frequent, gradually decreasing from 140 at the hour of birth to extreme old age; the female pulse is more frequent—by about five to ten in the minute—and softer than that of the male; it is slower in sleep than in the waking state; in inspiration than in expiration; muscular action and all the passions and emotions make it very frequent; heat augments, and cold diminishes its frequency and its volume; food and drink excite it into quick and frequent movement, in proportion to their stimulant quality; and it is liable to diurnal variations, twice a day undergoing a stated increase of frequency. Idiosyncrasies exist, too, which should always be inquired after.

In collating the several qualities of the pulse presented by a patient in any given malady, and endeavoring by rational inference to ascertain the conditions of the organs and functions indicated by it, we must pay due regard to the several elements by which it is constituted. Its frequency may depend upon the state of the brain as well as that of the heart—nay, upon the state of almost every other part or tissue; its slowness or its feebleness may be owing to change in quantity or composition of the circulating mass, as well as to impairment of impelling force; its irregularity or intermission may arise from sensorial disturbance, as well as from organic alteration of structure.

I have neither space nor disposition to enter here into a detailed discussion of the various modifications of pulses, yet there are a few so often met with, or so clearly indicative of certain conditions, that I am not willing to pass over them altogether. Thus, among other examples, the practitioner is frequently called on to distinguish between an *oppressed* and a *depressed* pulse, to use the phrase of Sydenham and Rush, by whom the importance of the distinction is strongly recognized. The oppressed pulse is small or contracted; it is usually frequent, though occasionally less so than natural; it may be, though I think not often, quick, abrupt, or jerking: and, if examined carefully, will rarely fail to exhibit a certain degree of resistance, or even tension. It is to be looked for in the earlier stages of disease, and in violent attacks implicating the vital organs, and more especially the alimentary canal. Depletion, by the lancet or otherwise, will often, in such cases, if timely and judiciously employed, develop the vascular action, rendering the pulse fuller, and softer, and less abrupt. Here, the original difficulty is probably to be found in the capillary system—the circumferential organs of circulation. The pulmonary capillaries refuse to admit or transmit blood sent to them by the right ventricle, which is hence clogged and its systole impeded. The diastole of the left ventricle is imperfect, because it is not followed by a sufficient current from the lungs. Its systole is not deficient in force, but acts on and propels an inadequate mass of blood; the arteries, not having lost their tonicity, become small by contracting upon their insufficient contents. The pulse is not weak, however, nor is the capacity of the heart for its contractile functions as yet impaired. The salutary effect of the lancet, and of other means of depletion and revulsion, is easily explained by referring to their influence in relieving the pulmonic congestion.

The depressed pulse obviously depends upon an exhausted and debilitated state of the central organ itself; or, it may be, on an actual loss and deficiency of the vital fluid. It is met with when disease has gone on unchecked to the stage of wasting and prostration; it is small, frequent, soft, and unresisting. To deplete a patient under these contingencies would be a dangerous, probably a fatal error.

A small or contracted pulse should always be examined with special attention; as it is obvious that the other qualities combined with this, are likely to be detected with greater difficulty in proportion to this defect of volume.

Yet, a very treacherous pulse, and one which is apt to mislead a careless or inexperienced practitioner, is the "gaseous" or "soap-bubble" pulse of Rush and Hosack, a compound of extreme softness and compressibility, with a full voluminous roundness of the artery. It is a symptom of great danger; denoting that the tonicity of the vessel is destroyed or so far impaired as to render it unable to contract upon its contents and diminish its diameter, in due proportion to the feeble current propelled through it by the heart.

The vibratory or undulatory pulse is not easy to describe. It gives to the finger the sensation of a fluid not passing fairly onwards, but checked in its progress for want of impulse, and returning, as it were, to its source like a refluent wave. It denotes extreme and general debility of the circulatory powers. I have seldom, if ever, seen an instance of recovery after it had been distinctly observable.

Hardness of pulse proves, first, that the tonicity and elasticity of the artery are unimpaired; and, second, that the heart acts forcibly. If the first condition were wanting, we should have a voluminous pulse merely; if the second, we should have a contracted pulse, not a resisting one.

Some physicians pertinaciously confound quickness with frequency of pulse. To show plainly how far they are wrong, take the instance of an intermittent pulse in which, regularly or irregularly, half the number of strokes are lost. The 80 systoles of such a pulse, beating at the rate of 160 per minute, would occupy but one-fourth of a minute. But the 80 systoles of a regular pulse of 80 per minute would consume half a minute, just double the time.

Slowness of pulse implies a deliberate systole of the heart; torpor or sluggishness, and not weakness.

Intermission of the pulse is a strange and often unaccountable phenomenon. It may observe a regular return, missing every third or fourth beat, and so on, or may occur irregularly. In some persons, it shows itself in every ailment that affects them. It happens frequently as the effect of accidents, fractures, dislocations, &c. It is often connected with dropsical affections, hydrothorax most especially, and is readily produced by the exhibition of digitalis and some other poisons. As we should anticipate, it is a usual attendant upon organic disease of the heart and the large vessels, as also upon sympathetic disturbances of the organ purely functional. I have met with it in the sound and sweet sleep of a healthy child, ceasing as soon as he awoke.

Under certain circumstances, a pulse of normal qualities, "a healthy pulse," is one of the worst possible symptoms. The state of the circulation is, or ought to be, in analogous relation to and correspondence with that of the other living functions, and the cause of disease must indeed have struck deeply and sure to sever this sympathetic connection. Such a pulse I have found in some of our worst cases of yellow fever, and the malignant attacks of pneumonia typhoides and congestive remittent; it occurs sometimes, too, in the last stage of protracted instances of cholera, where the abdominal irritation has ceased in a great degree, and a stage of cerebral disease has supervened. It is appalling to meet with it—calm, regular, soft, and full; when the system is sinking rapidly, and the approach of death every moment perceptibly hastening.

The condition of *the blood* undergoes many and characteristic changes, under the varied circumstances of disease. It becomes uncoagulable from great fatigue; it is found so after death from lightning and from a blow on the pit of the stomach. It is black in typhus; attenuated and dissolved in scurvy; and loses its salts and serum in cholera. One of its most familiar alterations consists in its buffiness or siziness, as the phrase is, met with in the phlegmasiæ and in pregnancy. This appearance has been explained, on the supposition that, its coagulation being unduly slow, the red globules fall to the bottom, leaving the yellow lymph on the surface. Gulliver and Jones ascribe it to an increased aggregation of red globules, whose affinity for each other seems actually enhanced, so that they adhere and run together, and so sink by their weight. Hewson and Davis attribute it to attenuation of liquor sanguinis; Zimmerman to defect of globuline, and undue amount of albumen and fibrin; and Simon to increase of hæmatine.

Emboli, or the formation of fibrinous clots or concretions within the heart and large vessels, has of late attracted attention. The term from the Greek "embole," injection, was first used by Virchow, who ascribes serious ill effects to the detachment of such concretions, which being carried along the current of the circulation, are arrested, and produce obstruction in remote and important portions of the vascular system.

Anæmia and hyperæmia are significant terms, used to express the opposite states of defective and redundant sanguification. Anæmia is a common attendant upon maladies which affect the abdominal viscera and impair the powers of digestion and assimilation, but shows no uniform connection with emaciation or atrophy. Consumptive patients are not always pale. According to Andral, the composition of the blood is altered in anæmia by "the diminution of its globular element; occasionally, however, we see the albumen and the fibrin of the serum diminish also with the globules." It usually attends or produces dropsies. It affects girls of feeble constitution, at and just after puberty, when the changes of that critical period have been imperfectly gone through. The elaboration of blood is a complicated and delicate process, which, if interrupted or much impeded, is apt to be abandoned altogether by the organs concerned, as respiration when for a time suppressed or suspended.

Hyperæmia, or mere general superabundance of blood, I do not know how to recognize, and can scarcely regard as possible; notwithstanding the views expressed by some pathologists, who seem disposed to identify it with plethora. Local hyperæmia, indeed, is one of the most familiar symptoms of disease, being, of course, met with in congestions of every source and character, active or passive, irritative or inflammatory. But I am not aware of any test by which a "general redundance" of blood can be shown to exist, or any circumstances from which it can logically be inferred. There is no standard by which we can measure or even approach the measurement of a normal or regular proportion of sanguineous fluid in the vessels of a sound and healthy body; we cannot then pronounce upon the limit of such quantity. We know when any organ or organs are oppressed or deranged by undue determination and accumulation of blood; but we never find all the organs thus oppressed at the same time.

Plethora, a term perpetually recurring, but ill defined, is always, I think, to be used relatively rather than absolutely; implying a loss of harmony, a want of proportion between the condition, the tone of the heart and vessels, and the quantity or quality of the blood. "The blood of plethoric persons," says Andral, "differs from ordinary blood in the greater quantity of globules, and the much less quantity of water it contains." On the contrary, Becquerel and Rodier announce as "an incontrovertible fact the existence of plethora in cases where there is a diminution of the globules," and attribute it to simple "increase in the mass of blood." Plethora was looked on by the older writers as of several varieties; they recognized plethora ad molem, ad spatium, ad volumen, ad vires. The first, ad molem, contemplated the absolute superabundance of the vital fluid; the general hyperæmia of which I have already spoken. Plethora ad spatium expressed the quantity in reference to the contracted state of the vessels; a condition which, I think, may be shown to exist as a part of the early history of congestive and malignant fevers, perhaps, indeed, of every febrile rigor. Plethora ad volumen regards the supposed expansion of the blood itself; and, indeed, it is by some such effect on the actual mass, subject as it must be to the universal law of increase of volume with elevation of temperature, that we shall most easily account for the common headaches of spring and early summer, apoplexy and insolation, and the frequent hemorrhages of that season. Plethora ad vires denotes the condition of the system in which the mass of the fluids and the force of circulation are disproportioned to the tone of the vessels containing them, or to their power of resisting the impulse incessantly acting upon them. These distinctions seem to be natural enough, and we may keep them still in view with advantage; nor do I see any difficulty in admitting a combination of the three last as constituting a not rare and very forcible predisposition to a great variety of forms of disease.

2. Of the DIGESTIVE SYSTEM, the disorders are shown: 1. By alterations in the condition of those parts which we can palpably examine; 2. By derangements of the function manifested in any obvious way; 3. By uneasiness, pain, discomfort, referable to any of the organs concerned in the function; and 4. By changes in the results of action of these organs, diseased secretions and excretions.

1. The tongue and mouth exhibit the influence of almost all forms of disease, and of fevers especially, undergoing alterations of appearance, supposed to be correspondent with and indicative of the morbid impressions made upon the interior portions of the tube. I know that this correspondence is denied to exist by Louis, the most minute of medical notemakers, whose patient industry is worthy of all praise and imitation. But I cannot help thinking that he has laid too much stress upon exceptions and anomalies, and must adhere still to the opinions founded upon a long experience. I am pleased to find this view confirmed by the sagacious and philosophical Holland who says: "Among the external indices of change within the body, the tongue is, perhaps, the most valuable. Scarcely can the pulse compare with it in the extent, variety, and accuracy of these indications, which are not limited to disorders of the membranes and secretions of the alimentary canal, or to the presence of fever in its various forms, but extend also to the various states of the nervous power, the sensibility, the voluntary powers, and even the more intellectual functions. The physician cannot better study any set of signs, than those afforded by the tongue, the palate, and the fauces; the terminating portions of that inner surface, along which so many actions are carried on, both of health and disease. The observations of Dr. Beaumont on the precise and uniform relation of the tongue and stomach in the case of St. Martin might justify this remark, were it needful to seek any other authority than that of daily experience."

The tongue is cold in bad cases of cholera. It is dry in typhoid fevers, and such as present a paramount derangement of the sensorial system. When the gastric and intestinal secretions are defective from inflammatory irritation, it assumes a fiery redness, and is pointed, and hard, and dry. When these secretions are abundant and vitiated, it becomes soft and swollen, and a nauseous and offensive mucus is effused in the mouth. When the mucous tissue or its glands have ulcerated, it also ulcerates or is aphthous. Hepatic affections cause it to put on a yellowish fur, and to be affected with a bitter taste. The mere color of the surface, which grows darker as danger increases, is a symptom of importance in the fevers of our climate. When covered with a black sordes, which also gathers upon the teeth, and adheres to the lining membrane of the mouth, we infer the state of the patient to be truly critical. This sordes, though first seen on the teeth and gums, is said also to be exuded upon the internal surface of the bronchi, and of the pulmonary cells, impeding of necessity, the results of the function of respiration, and preventing the proper changes of the blood, which hence is always black in typhus.

We account for these and all other similar facts, on the principle of direct and continuous sympathy; identity and continuity of structure, and community of function connect the internal seats of morbid action with the external extremities of the tissues affected, and give rise to similar disturbance from the application to any part of a whole so indissolubly connected, of an agent capable of an injurious impression.

By exploration of the abdomen, we also arrive often at inferences greatly instructive, and indeed essential to a correct intelligence of the case before us. We distinguish by resonance upon percussion, such enlargements as depend on air within; by fluctuation, the fluid effusions; by pulsation, the vascular, as in aneurisms; and by the resistance, and weight, and position, the physconiæ or visceral enlargements of spleen, liver, &c., and other tensions and swellings.

2. Derangement of the digestive functions arises sympathetically in a great many forms of disease of which it is not essentially a part. It shows itself in the first instance by anorexia, or loss of appetite. Next, there is a sense of oppression, aggravated into nausea, and vomiting, which seems excited to rid the stomach of some load. We are not, however, always to infer the presence in that organ of any noxious matter from these disturbances—a mistake which has done much harm. They occur under very varied circumstances; being produced not only by irritation and inflammation of the mucous coat itself, but also by determination to the brain—as in approaching apoplexy, and in sea-sickness, and some headaches. In fever, this state of the stomach is very general, and arises from both the conditions above alluded to—the irritation of the abdominal viscera, and the disorder of the cerebral and sensorial system.

3. The digestive organs, unconscious and insensitive in health, become, when diseased, or when deranged sympathetically, susceptible of many forms and degrees of pain and discomfort. Some of these seem purely neuralgic, and are consistent, as in dyspepsia, with the performance, somewhat impaired perhaps, of their important functions. Others arise from inflammation, or from distension, pneumatosis, or from the pressure of the neighboring parts enlarged or indurated.

4. The results of morbid action, as shown by the changed appearances of the secretions and excretions, always demand our attention. Matters vomited are of exceedingly varied aspects. Some of them seem capricious or insignificant; others are characteristic, as produced by, or associated with, certain diseased states or known lesions. Of the first, are the foul and porraceous matters thrown up in the first stages of fever, and in some indigestions; bitter, oily, rancid, acid, and alkaline; of strange hues—white, green, brown, and blue. Of the characteristic, we may mention the black vomit, so often spoken of as diagnostic of yellow fever. To this pestilence, however, it does not

belong exclusively, although it occurs so generally in its fatal progress that it may fairly be regarded as one among its regular symptoms. It may and does happen in fevers of every type, and in many other maladies—as enteritis and gastritis. It has been met with in the unterrifying vomitings of pregnancy, and comes on before death in the lamentable cases of rupture and laceration of the uterus. The rice-water discharges of cholera, generally considered albuminous, are almost peculiar to that horrid pestilence. Dysenteries and diarrhœas are marked by certain well-known qualities of the alvine evacuations, which it is not necessary here to describe.

3. Respiratory System.—Dyspnœa may be continuous or paroxysmal; may arise from mechanical impediment, or spasm, or disorganization, or muscular debility. The use of the word orthopnœa indicates that the difficulty of breathing is increased in a recumbent, and relieved more or less in the erect posture. This is assumed to depend upon a movable effusion, but incorrectly; for it is also met with in asthma and other diseased states, in which no fluid is imagined to be effused.

Special slowness or hurry of breathing in fevers, especially if protracted, should be carefully noted. The first may indicate oppression of the brain, or exhaustion of the vital energies; by the latter we are led to fear the occurrence of pulmonary congestions, or of such changes in the condition of the pulmonary mucous surface, as shall prevent the due action of the air upon the blood. This happens in typhoid cases, where the bronchial tubes are coated with a dark, tenacious sordes.

Yawning and heavy sighing betoken an imperfect circulation through the lungs. They attend upon the cold stage of all fevers, even the slightest intermittents, but mark the congestive forms so often fatal.

Cough, and the expectoration which it effects, are often characteristic. The sound of cough shows laryngeal disease—croup in the child, and phthisis in the adult. Tubercular cells, pus, offensive sanies, rust-colored mucus, show inflammation in its various modes, and the presence of morbid deposition, and must be observed attentively. The physical exploration of the thorax by auscultation, mediate and immediate, percussion, and other methods, constitute a very important addition to the modern course of medical study, which will require to be frequently referred to.

4. Sensorial System.—Every morbid alteration of structure or of function implies pain, with exceptions so few that the rule may be laid down unhesitatingly. Pain, however, varies much, both in kind and degree, not only in relation to the intensity of the disease with which it is connected, but also both to the general susceptibility of the patient and to the peculiar sensibility of the part in which it is seated. All these circumstances must be taken into consideration, before we proceed to deduce any inferences either from the nature or amount of pain suffered. Nothing can be more embarrassing than the complaints often made to us of extreme pain, when the closest examination does not de-

tect any cause adequate to account for it. This is the history of many obscure cases of neuralgia. We are apt, in dealing with certain classes of patients, to become uncharitable, and to suspect soldiers, sailors, convicts, and servants of malingering, when we find no objective signs of corresponding disease, and are called on to listen to loud and long descriptions of suffering. Let us be cautious here. It is possible that pain may exist, not as a symptom, sign, or manifestation of disease, but as a primary, idiopathic, insulated morbid condition. An instance, apparently of this sort, is given us on no less authority than that of Foderé, who tells us the story of a young man dying under his care, as he alleges and affirms, of pain, and pain only. "After his death," says Foderé, "I anxiously explored, by means of the scalpel, all the seats of the pains, but could discover nothing in the muscles, the nerves, or the viscera; and I was forced to believe that life had been destroyed by the long continuance of the pains."

Pain generally points out the locality of disease; a nice and patient examination should always be made of the part to which it is referred. Yet the exceptions to this law are numerous, and some of them highly impressive. We have a pain at the top of the shoulder when the liver is inflamed, so uniformly that I have never met with a case in which it was absent; though I am aware that both Stokes and Andral—names always to be mentioned with respect—deny its regular coincidence. When the hip-joint is diseased, the pain is often in the knee. There is severe pain in the urethra and in the testicle when a calculus is present in the kidney, or passing from it through the ureter. A gall-stone in the biliary duct excites harsh pain in the stomach. Many intestinal disorders afflict children with itching of the nostrils, and adults with tenesmus and pruritus. Verminous and hepatic irritation sometimes excite a harassing uneasiness in the larynx and trachea, with ceaseless and violent cough. A nerve, affected at any point of its course, may convey its peculiar sensation, ascribed always by the mind, with misled consciousness, to its peripheral extremity, this being the normal seat of its characteristic sensibility. Hence traumatic neuralgia, in which those who have undergone amputation feel pain in the fingers and toes. Of these misplacements of pain, sympathetic and otherwise, experience has, in many instances, taught us the significance; in many others, they are still obscure and ill understood.

Pain is more or less modified by the nature of its cause and origin, and thus becomes indicative of the kind of morbid change upon which it depends; such as inflammation, distension, compression, spasm, or cramp. To this law, also, of the relevancy of the modes of pain to their causes there are many exceptions. Acid in the stomach will create a sense of heat, heartburn, as vehement as gastritis; sharp, lancinating pangs occur in cancer, fissures of the sphincter ani, and some glandular ailments, as irritable breast and testis, as well as in distension from colic; the flashes of electrical agony which startle the neuralgic, belong promiscuously to a large class of disorders, mechanical as in calculous affections, inflammatory as in gout, and undefined; and aching is a term applied alike to the ineffable torments of cephalalgia, the anguish of a decaying tooth, and the oppressive annoyances of lumbago and sciatica.

Pain differs in different tissues, by virtue, as we may suppose, of their intimate structure. The serous tissues suffer acutely; when inflamed, they assume a new and exquisite sensitiveness. Mucous membranes and parenchymata, generally, are, on the other hand, liable to dull uneasiness, comparatively speaking. In cerebral affections, we suppose the keen piercing pain to be meningeal; that of the neurine or brain proper, to be heavy and oppressive. So in hepatic inflammations; that of the investing membrane being acute, while the reverse is true when the substance of the liver is attacked. Inflammation of the digestive mucous membrane may proceed almost unfelt to a fatal extent of disorganization, as in typhoid fevers, with their follicular ulcerations, and in chronic dysenteries, and sometimes in gastritis and in enteritis; but if the investing membrane be invaded, as in perforation, or forcibly distended as in colic, or strictured closely as in hernia and intussusception, the agonies of the patient become unendurable. There is a peculiar modification of pain met with under certain circumstances, consisting in alternate inflictions and remissions or intervals, such as give the name to tic douloureux, which may be regarded as the type. These "tics" are commonly considered as characteristic of neuralgia, properly so called; but they are met with in catarrhal inflammation of the frontal sinus and antrum, and in the passage of a calculus from the kidney along the ureter.

The intensity of pain is modified, as I have already said, by the general sensibility of the subject, and the special sensitiveness of the part; it is often regarded as the measure also of the violence of disease, of its rapidity of progress, and the degree of change occasioned, and of the specific malignity of the morbid action. All these points must be attended to. Some persons are nearly insensible to ordinary inflictions, and complain little under any circumstances. There are national or tribal differences, in this respect, as well as individual idiosyncrasies. We would expect a delicate and refined lady to suffer more in any malady than a laborer. Nor would we wonder at the degree of pain in disease of the eye, the mamma, the testis, which are normally sensitive and exquisitely perceptive. We are well aware, too, that the most destructive processes may go on slowly without great uneasiness, comparatively speaking, while any considerable change in a part occurring promptly shall cause severe distress. Lastly, we know that cancer and lupus, gout and rheumatism, angina pectoris and syphilitic nodes, are in their own nature methods of indescribable torture. But we are also familiar with the fact that certain parts, entirely insensitive in their normal state, become, when inflamed in their simplest and least destructive manner, keenly alive to pain of the highest extremity, as has been already noticed in reference to the serous tissues, and is equally true of the membranes investing bones and joints, and some of the glandular and parenchymatous structures. The pungent stitches and keen lancinating stabs that announce the inflammation of the pleura and peritoneum; the agonizing spasm, heat, and laceration that attack the heart when diseased, are but too well known. The brain, which in its normal condition may be cut or torn to pieces without consciousness, will, under the most transient and slightest disturbances, functional and organic, idiopathic and symptomatic, arising mechanically, as from the movements of a swing or a ship; from sensation, as when the eye is subjected to unaccustomed light; from all forms of mental emotion or intellectual action, ache oppressively and insufferably. The kidney, too, that most obtuse of the viscera, will, in nephritis and nephralgia, be filled with anguish unspeakable. Do such parts acquire, in these new morbid states, a new power or faculty not inherent or previously belonging to them—the faculty of receiving impressions and conveying them, the power of generating nervous force? If so, how is the impression made upon them transmitted to the brain and converted into a sensation? If by nervous cords of communication previously existing, why were the parts previously insensible or unconscious? Or can such cords or nerves exist, capable of sensitive impressions, yet conveying none in health? Or can sensation be aroused independently of them as a local function, without the necessity of communication with a central sensorium? These are questions which seem to be worthy of a more profound investigation than they have yet received.

On the other hand, the absence of pain in some diseases of sensitive parts, and in violent cases of general disease, is among the worst of symptoms, as indicating the subversion of the ordinary nervous sensibility of tissue, or the general impairment of nervous power. This occurs not very unfrequently in certain malignant disorders. A patient dying of yellow fever or typhus will sometimes affirm that he is quite well. It is also met with in cholera and the plague. A degree of it is often evinced by inattention to blisters and sinapisms.

Disordered perceptions, from a morbid condition of the organs of the special senses, give reason for unpleasant inferences. The appearance of motes before the eyes, dimness or confusion of sight, strabismus, vertigo, blindness, betoken, usually, some cerebral derangement. Permanent contraction of the pupil is generally attributed to inflammatory irritation of the brain or its membranes, and is usually coincident with sleeplessness, pervigilium. Dilatation of the pupil is the effect of compression, either vascular or extra vascular, of that organ, and is for the most part attended with drowsiness, stupor, coma, and convulsions. Double vision is a curious phenomenon, occasionally arising in disorders affecting the digestive organs; it is sometimes met with in hysteria. Some vegetable poisons produce it; as a drunken man is proverbially said to see double. When unassociated with strabismus, it is inexplicable; it is most probably occasioned, in a majority of instances, by the unequal or disassociated action of the muscles of the globe of the eye, by which their axes are directed abnormally, and two images are seen instead of one. Tinnitus aurium is, in middle and advanced life, a warning often of undue determination to the encephalon, and of a tendency to apoplexy and palsy.

The chilliness which ushers in so many fevers is a very obscure symptom. Some ascribe it merely to internal determination and congestion; but it bears no relation to them in degree, being often severe in the least dangerous attacks, and slight in the most malignant. I have seen patients die promptly of congestion without complaining of cold; and, indeed, in cholera, they sometimes complain loudly of heat, while the surface is of icy coldness.

MOTORY SYSTEM.—The muscles and joints are liable to certain specific modes of disorder, resulting also specifically. In rheumatism, the inflammatory process rarely gives rise to purulent effusion; but the symmetry and usefulness of the parts are impaired by induration and permanent tumefaction, irregular and deforming. In gout, there is deposit of earthy matter in the smaller joints, with ulceration. The most familiar and important of the affections of this system, however, are inseparable from derangement of the sensorial functions; such as paralysis, cramp, tonic, and clonic spasm, the great variety of forms and modes of convulsion. Paralysis depends on a suspension or loss of the supply of nervous force or influence derived from the cerebro-spinal axis. Pressure upon any portion of the intra-cranial contents will occasion a loss of the motivity or the power of voluntary motion at least, on the opposite side of the body. Injury or disease of any part of the spinal cord, will produce the same palsy of the portion of the body whose nerves of motion arise below that point. Relaxation of sphincters is always an unpleasant symptom.

For the explanation of cramp, spasms, and convulsions, we must refer to the doctrines—best taught and illustrated by Marshall Hall—of reflex-motory or diastaltic action, upon which depend so many of the physiological functions of the body. There are several modes of excitation of the morbid reflex movements, such as: 1. The merely impressional, a good example of which we find in the verminal convulsions of young children, and in some obscure and seemingly causeless epilepsies. 2. The sensational; convulsions produced by pain or pleasure, or, as is said to happen, by tickling. 3. Those of combined character, impressional and sensational, as in cramps from local injury, and, perhaps, in trismus and tetanus. 4. The emotional, as when convulsions ensue from violent passion, or chorea from fright. 5. Morbid changes in the brain and spinal marrow. 6. Morbid change in some portion of an incident excito-motor nerve, not necessarily at its extremity, as in the aura of epilepsy.

Cramps and spasms of great diversity connect themselves prominently with diseases of the digestive tube, as in colics and cholera morbus; and in epidemic cholera are well known to be among the most annoying symptoms, not only affecting, as in the above maladies, the muscles of the limbs and trunk, but, probably, the heart itself, thus proving sometimes suddenly fatal. Some of the poisons used as medicines produce severe cramps, by irritating the stomach; antimonials especially.

Hiccup, a diaphragmatic spasm or local convulsion, requires to be noticed here. It attends upon gastric disturbances of varied character, inflammatory and neuropathic. In fever it is a bad symptom, and by protraction, a source of great disturbance and ultimate exhaustion, preventing all rest or repose. Similar spasm, or subsultus of the muscles of the limbs, often precedes death, in fevers especially.

EXCRETORY SYSTEM.—The skin and the kidneys are the organs chiefly engaged in the important office of eliminating effete and injurious matter from the system. The skin aids the lungs in getting rid of the carbon from the blood, as well as yields all the elements of perspiration. Its dryness and morbid temperature attract our attention in fevers, and seem to indicate the suspension of its necessary action. The heat which it attains in bad cases of yellow fever and of scarlatina, is very high, ordinarily. In congestive fever, of every kind, it is apt to be cold, as it is, strikingly, in cholera. This would seem to be caused by a paralysis of the minute vessels which carry on the capillary circulation. If long continued, it must be productive of evil, as well as indicative of a very unfavorable condition of the patient. A cool relaxed state of the skin, with profuse clammy perspiration, sometimes attends upon malignant fevers, and is almost always a fatal prognostic. Epidemics designated by this characteristic have happened from time to time. During the fifteenth and sixteenth centuries, there were several such, chiefly affecting the English race, whence their names of Ephemera Britannica, Sudor Anglicanus, or sweating sickness of the English. Contemporary writers, however, show that their exclusiveness was by no means complete; and in recent times some of the departments of France have suffered from similar epidemics, though of far less marked malignity, as the "Suette de l'Oise" of 1821, described by Rayer; that of 1849, observed by Verneuil. The sweat itself undergoes diversified changes in disease, acquiring a yellow color, an acid, or ammoniacal quality, &c. The yellow hue is indicative of the diffusion of bile; acid perspiration is said to belong to rheumatism and catarrh; and ammoniacal exudations to typhus. Many diseases may be known by their specific odors exhaled; smallpox, scarlatina, and I think several others.

The urine affords us, in its appearances, many instructive and important phenomena. Its quality should be noted; the suppression of its excretion is always attended with danger; the elimination of its nitrogenous elements is necessary to health. When very abundant, it is apt to contain sugar, a morbid condition much to be deprecated. In certain diseases of the kidney, granular or fatty degeneration, it exhibits the presence of an undue quantity of albumen. It presents much admixture with epithelial scales, broken down blood globules and pus, in nephrites and oxyluria, with crystals of oxalate of lime. Many other earthy matters are often found in it.

MISCELLANEOUS PHENOMENA.—The *physiognomy* of disease is often marked and characteristic. He who has once seen the countenance of malignant yellow fever will never forget it, or pass by, without startled attention, a similar aspect. The tense forehead; the muddy eye, suffused and watery; the dark flushed mahogany or bronzed cheek; the anxious expression of mortal terror, or the gloomy sullenness of despair, form a picture deeply impressive, as well as strongly indicative of fatal ailment; nor can we easily mistake the thin clear hectic cheek and bright eye of tubercular phthisis, or the haggard and sallow aspect of malignant tumors and ulcerations. But it is not possible to go into full detail on this interesting part of my subject.

The "risus sardonicus" of the books is described as a grim sarcastic smile, evincing some painful hallucination of mind. It is said also to be occasioned by inflammation of the stomach and the diaphragm.

The "facies hippocratica" consists in a hollowness and sunken appearance of the eye; the nose being sharp and compressed; fallen temples; the forehead tense and pale; the visage thin and livid. It portends approaching death.

The *decubitus* of the patient—his posture in bed, is often significant. Confinement to any one position is unfavorable, and should prompt to an examination for its cause; still worse is it when very awkward or constrained, as when he can lie on his back only with his knees drawn up; or when from great weakness he is always sliding down to the most dependent part of the bed. Jactitation, and a restless desire to move from bed to bed or from room to room are very unfavorable—especially in children; towards the close of life, he often seems to see minute objects in the air above him, catching at them, and picking the bedclothes with his nails and fingers.

IRRITATION, CONGESTION, INFLAMMATION.

It is scarcely possible to discuss the simplest proposition in pathology or therapeutics, without repeated allusion to that condition of disease so familiarly known under the term inflammation. Affecting as it does, every tissue; modifying, as it may, every morbid movement in the general system: combining or concurrent, as so frequently happens, with every varied derangement, either of function or structure, it is perpetually before us, demanding our attention, as cause, or consequence, or coincident of almost every malady. And the same thing may be affirmed with equal truth of the general subjects of irritation and congestion so nearly allied, yet so definitely separable. A brief investigation into the nature and history of these states of morbid action is, therefore imperatively demanded of us, and must be entered into as preliminary to a due understanding of the long series of topics which are to engage us.

These words, congestion, irritation, and inflammation, are to be read upon every page of modern pathological discussion; but they have come to be applied, each of them, to so wide a class of phenomena, as scarcely to convey the same precise meaning on any two pages, whether of the same or different writers.

Irritation and inflammation are represented by some authors as identical in nature, though perhaps differing in degree; by others they are hypothetically assumed to affect exclusively separate tissues; and the idea is often suggested of their being contrasted both in mode and form. We cannot avoid, in pursuing our systematic course of inquiry into the history of disease—we cannot, I say, avoid entering within this labyrinth; let us hope that we shall not be utterly lost in its intricacies.

IRRITATION, of which we shall first treat, is often spoken of as excitement or stimulation, the words being used promiscuously. We meet with the phrases "normal and abnormal irritation," "normal and abnormal excitement," used in such manner as to imply no difference between the natural and morbid, except in mere degree. Inflammation is also spoken of as excitement or stimulation, and hence it follows from the use of this common and interchangeable language that the careless thinker is irresistibly impressed with the idea of identity of nature and character in the several conditions referred to.

As the first step in our researches, let us endeavor to ascertain what irritation is not, and simplify our task by distinguishing it in its essential characteristics from all accidental or incidental complications.

1st. Irritation does not consist in stimulation, hyperexcitation, or increased vascular action. As this is the prevailing doctrine of the day, it may require a closer examination. It would be well if those who maintained the affirmative of this question would instruct us in the exact meaning which they are desirous to attach to the words "excitement and stimulation." While some hold irritation to be identical with inflammation, and consider the expressions stimulation and excitement synonymous with both, others draw a line between the two first, regarding irritation, however, as a necessary antecedent, or indeed an essential element of inflammation.

It is easy to prove the error of the first of these notions. The eye may be irritated intolerably by the admission of a strong glare of light upon it; the ear by a harsh discord or loud sound, as of a drum or gong too near; the teeth set on edge by the grating of a saw or file. Inflammation is not present in any of these cases, nor in the tickling which urges irresistibly into convulsive laughter; nor in the cough produced by the admission of an atom of dust or water into the rima glottidis. But irritation is in so many instances an antecedent of inflammation, that their necessary connection was matter of ready and plausible inference. We shall however find them, upon a careful analysis, to be fairly separable. Irritation, as the very term seems to imply, and as we shall endeavor to show, marks its presence by prompt and obvious phenomena, and cannot exist without making itself felt and seen. The results of inflammation often exhibit themselves, on the other hand, unexpectedly, and are developed insidiously. Tubercles occasionally enlarge, maturate and break down without any notable disturbance referable locally. Thus, also, in certain cases of rachitis and marasmus, and of ramollissement of the brain and spinal marrow with fatuity and paralysis, we have the alleged results of inflammation occasionally exhibited without our having been in any way made aware of the progress of the morbid changes.

2d. Nor is there anything in the nature of irritation which so connects it with inflammation that the latter state shall of necessity ensue, either from the intensity or protraction of the former. There must be an intensely severe degree of irritation affecting the universal system in trismus nascentium, and in traumatic tetanus; yet in neither of these examples can we demonstrate the presence of inflammation in any part or tissue. A wound inflicted may have healed perfectly; nay, it is supposed by a majority to diminish, and is not imagined by any to increase the danger of fatal and irritative spasm, if we keep up or renew the inflammation of the wound by stimulants. Hydrophobia, that most obscure and mortal malady, offers us another remarkable instance of intense and protracted irritation unproductive of any notable inflammation, and connected, as far as is observable, with spasm only. Of sympathetic irritations, uncomplicated with any supposed inflammatory tendencies, farther instances may be adduced in great numbers. Galvanism, which will arouse even a recently dead body into contortions frightful to look at, agitates uncontrollably the living subject. Nux vomica, and other drugs, excite spasmodic muscular motions by their specific influences. The heart may be urged into convulsive action by mental emotion, on the one hand, and on the other, by the efficiency of known physical agents. Now all these impress directly, or are reasonably supposed to act upon that principle which in discussions concerning animal life we call irritability, and this alone.

Irritability, the *vis insita* of Haller, is a property existing, perhaps, in all the tissues of a living body, though in very different degrees. Its intimate nature is unknown, but I do not hesitate to consider it a mere modification of that excitability, which is the exclusive and essential characteristic of life, and which distinguishes, indeed, a living from a dead body. It feels in the nerve; it contracts in the muscle; it renders each portion of every organ susceptible of the impression destined to awaken it to its own peculiar action or function. This, it is readily perceived, is its physiological history. But it is also susceptible of the influence of hostile or injurious agents, and when thus impressed, urges to morbid and destructive action the several parts affected. The nerves tingle with horrid pain; the muscle refuses to obey the control of the will, but contracts irregularly and forcibly with spasm, which, when it interferes with the constant and uniform play of certain organs, puts an end to life at once; as when the heart and diaphragm contract spasmodically. The irritability of other tissues is comparatively obscure; the irritability of nerve and muscle is obviously unequivocal. Pain, then, and that mode of muscular contraction which we call spasm, are the direct effects of irritation properly so called, and emphatically. There is no necessary connection between them; they do not always occur together. A nerve, as in toothache, and perhaps in some other forms of neuralgia, may be violently irritated without disturbing any single fibre capable of contraction. A muscle, or many muscles, or only a portion of a muscle, may, as every one has doubtless seen, be irritated into spasm, shown by involuntary and irregular contractions, without pain; as in hiccup, cough, etc.

Parts are usually irritable in proportion, as the phrase is, to the intensity of their vitality, which is also regularly proportioned to the supply of nervous influence which they receive, or to their contractility.

An abundant influx of red blood was supposed to be necessary to the full development of this quality or property; but the eye and all its parts are exceedingly irritable, though nourished with colorless blood. Red blood is found in some of the colorless tissues when inflamed, as in ligaments, tendons, fascia; and these appear to be thus imbued with new modes of vitality, becoming both irritable apparently and highly sensitive.

There are certain modes of irritation which seem to lie upon the doubtful line which separates physiological from pathological actions. I have had occasion to allude to the tickling which produces inextinguishable laughter, and irrepressible contortions of the body—to cough, whose purpose or final cause is the expulsion of some irritant from the respiratory cavities—and to hiccup, a singular and unaccountable movement of involuntary and sudden contraction of the diaphragm, usually the result of some obscure disturbance of the stomach. Sobbing and sneezing are equally involuntary, and seem to involve, though in a dissimilar manner, the whole series of muscles engaged in respiration. The use of the former, which almost exclusively attends upon the depressing mental emotions, we do not know. The latter removes annoyances acting on the Schneiderian membrane. All the mucous surfaces seem notably irritable, being highly vitalized by innervation. The various modes of irritation which affect them, are among the most important and extensive sources of constitutional derangement. We know not clearly how the sympathetic impressions are diffused, nor what determines the direction they shall take, but we know that they are subject to great diversity. The stomach or the duodenum, the ileum or the colon being disturbed by an irritant, we may have gastritis or enteritis from inflammatory excitement of the tissue disordered; or we may have the secretory vessels urged to undue and unnatural action, and made to pour out mucus and pus, as in diarrhœa and dysentery, or abundant serum as in cholera; or the muscular coat shall be thrown into undue and irregular contraction, checking the peristaltic motions, as in colic and constipation, or even by some strange perversity of influence reversing the movements, as in iliac passion with stercoraceous vomiting.

Serous membranes, though quite as ready to take on the inflammatory condition, are by no means so irritable. They are probably somewhat less highly vitalized, as they can scarcely be said to be actively engaged in the performance of any one of the more important functions of the economy. Yet these membranes, like other colorless tissues, pass when inflamed, into a state of intensely augmented susceptibility and sensibility, suffering extreme pain, and sympathetically radiating violent disease. Here it is obvious that inflammation is not only antecedent to irritation, but that it actually develops irritability.

This is one of the numerous and familiar examples of the immediate connection and consent of action, which so generally obtains between the nervous and vascular tissues of the body; tissues which, though not the exclusive seats of vitality or the vital properties, are doubtless the exclusive media through which all other tissues are vitalized originally, and continue to enjoy life. That the connection is reciprocal as well as close and tenacious, is easily shown. Pain and spasm may be, as we have seen, excited by inflammation; on the other hand, secretion is among the prompt and immediate effects of irritation, as in the quick flow of tears from a hurt eye, and of mucus from the mouth under the influence of temperature or sapid substances. Many of these actions, wherever commencing, are diffused either slowly or rapidly by sympathy; at least this is the received doctrine, though I surely need not dwell upon the confession—how vague and inconclusive is all the knowledge we possess of the *modus operandi* of this mighty power, through which, it is not too much to affirm, almost all the vital processes are influenced perpetually, and impressed for good or for evil; happily, or to our injury. The central portion of the nervous system, the brain, being disturbed by mental emotion, the heart palpitates or throbs convulsively, and the cheek blushes or grows pale. So, also, if we apply friction or percussion to a sensible part, or excite pain locally, the vessels of that part will admit and become distended by red blood, and if a secreting surface or organ, its secretions are promptly increased or deranged.

Should we essay to divide and distinguish diseased conditions under the three heads of irritation, sedation, and inflammation, the first might, I think, be shown to comprise three-fifths, or more, of the whole range of morbid phenomena.

The causes of irritation are infinitely numerous, and as diversified in their nature as the susceptibilities of the organs and tissues which they are adapted to impress. We may separate them into two classes, designating them, according to their mode of operation, as direct and indirect. The first will include all those which, when applied to any part, produce in it a morbid sensation or contraction; I say morbid, for we are discussing the subject pathologically, not physiologically.

Broussais specifies four causes of irritation:—

1st. Excessive excitement, by certain agents called stimulants or irritants, directly applied.

2d. Sympathy with another irritated organ.

3d. The absence of a stimulus which is habitual to the part; and,

4th. Repulsion of excitability from other parts.

In the first specification, he reasons in a vicious circle. He assumes that irritation is excessive excitement. Then it follows that agents directly producing it are excitants, stimulants, irritants. Or, he assumes that such agents are excitants, stimulants, irritants; and then it follows that their effects must be excitement, stimulation, irritation.

Now, some of the agents capable of arousing vehement irritation are not proved to be stimulants in any received sense. Who would call the poison of a hydrophobic animal a stimulant? or the venom of a rattlesnake, or datura stramonium, or strychnia? They certainly cannot be regarded as stimulants in the same mode as phosphorus, or alcohol, ether, or capsicum, or vol. alk.

In the second, he takes for granted the essential necessity of some local affection. This I acknowledge to be highly probable, but cannot consider it as yet to be fully proved.

To his third I object, because of its obvious incongruity with his first. If the presence (or application) of any agent be stimulant, how can its absence (or removal) be also and alike stimulant? Such removal may be a mode of impression, I admit; but this cannot be precisely of the same nature with its continued presence. The sudden silence of a public speaker is impressive, and will often arouse promptly those who have been lulled to sleep by his discourse. It should be recollected that Broussais confounds all modes of impression under the wide character of stimulant or exciting, which, he says, is irritation.

His fourth I deny to be possible. Excitability is a property or quality. He is justly chargeable with ontology (a heresy which he spent his life in denouncing), when he treats of it as a matter or substance, to be moved hither and thither—repelled, attracted. It may be destroyed or diminished, enhanced, or heightened, in any part; but I cannot conceive of its repulsion or attraction from any one locality to any other.

Pain in the part is the most general of the symptoms of irritation. The nature of this morbid sensation is not clearly understood, nor will it be, until we have succeeded in attaining some definite knowledge of the nature of sensation in general. Suffice it to say, that all agents which impress the nerves in a manner unadapted to their original and natural susceptibilities, tend to give pain. Agents best adapted to these susceptibilities also give pain, instead of pleasure, when their application is too long continued, or their force or concentration too great. The final cause of this effect is easier to be understood than the mode in which it is brought about. Like satiety, when our natural appetites are gratified, it is intended to protect from wasting indulgence and the disproportionate employment of organs.

Spasm constitutes a formidable condition of disease. As pain is for the most part, though with exceptions, a direct effect of an applied irritant, so spasm is very generally an indirect or sympathetic consequence of some morbid impression. It is unnecessary to repeat here the acknowledgment of our inability to trace the several links which connect the original lesion with the series of morbid effects arising, and transferred or diffused. A puncture of any extreme point of the cutaneous surface, the fracture of a bone, the extraction of a tooth, any wound whatever, nay, a blow which has produced no wound or abrasion, may give rise to trismus and tetanus. The convulsions of hysteria and epilepsy are among the most obscure of all morbid phenomena, depending on causes of irritation so transient that their impression seems to pass away in a few minutes, so little within the reach of our investigations as to remain undetected by the most careful scrutiny, yet so tenacious as to protract their recurrent influence throughout a long life, and so vehement as not rarely to put an end to life itself. Dentition, a process natural and unavoidable, is often the efficient cause of violent and fatal convulsions. So is mental emotion of varied character; and there are several poisons which give rise to rigid spasm of horrid aspect.

Secretion is, in certain tissues, affected promptly by the causes of irritation. Annoy the eye with too much light, and tears flow profusely from the lachrymal gland. So, if we apply a sapid, or pungent, or acrid substance to the tongue, the mucus of the mouth and salivary glands gushes forth abundantly. That this rapid secretion is usually given out from the vessels under the sympathetic excitement of their nerves—intense "innervation," as some phrase it—I will not deny, but I conceive that this is not the essential or exclusive mode. The immediate efficiency of certain agents seems to me directed at once upon the secretory surface and vessels. It is not true that those acrids most sensibly felt by the delicate nerves of the tongue bring on the greatest mucous discharge from the mouth. Many things increase the quantity, and alter the composition or quality of the intestinal secretions and excretions, without affecting notably the sensibility of their extensive mucous surface. The secretions of all irritated parts are apt to become vitiated and assume morbid qualities, although there may be no apparent change in the structure or permanent condition of the parts. The results, differing with the modes of action upon which they depend, develop specific and characteristic peculiarities in many known cases. The saliva of a hydrophobic animal thus becomes virulently, nay, fatally, poisonous; and cases are related by authors of high estimation in which analogous qualities were exhibited in the saliva of men provoked to vehement and malicious rage, whose bite proved mortal.

CONGESTION.—It is an old maxim in pathology, though perhaps admitting of some dispute whether it be correctly true as the statement of an uniform fact—"ubi irritatio ibi fluxus"—that determination of blood ensues necessarily upon irritation of any part.

"*Determination of Blood*" admits of explanation in three modes. The first I will call passive or revulsive, as being the effect of causes acting upon some distant part; as when blood expelled from the surface by cold, &c., is driven upon the internal viscera, whose vessels are thus distended. The second exists when the arteries supplying a part, becoming rigid by the undue excitement of their contractile force, give the current passing through them—so Arnott points out—an increased impulse. A leaden tube requires less *vis a tergo* to conduct a stream of fluid to a given point than a leather one; and with the same will send it farther or more forcibly. In the third, the part itself, the tissue or organ, may assume or be impressed with greater affinity—chemical or vital, or chemico-vital—for the blood, and may solicit, or become capable of receiving, either to transmit or to retain, a greater quantity.

"I infer," says Prof. Draper "that the nervous system has the power of throwing organized atoms into the *active* and *passive* state; that this is the fundamental fact upon which all the laws of interstitial death depend, and upon this principle—namely, its existing *allotropic* condition, an organized molecule either submits to the oxydizing influence of arterial blood, or successfully resists that action." It is by reason of their being in this *active allotropic* state that the effete particles of tissues are prone to seize oxygen from the blood. We are accustomed, he says, to refer all such phenomena to the influence of the vital force; but what do we know of this power? The phrase is an empty one. Inflammation he regards as oxydation. The circulation depends on the (chemical) relations of the tissues to the blood. In inflammation there has been that *allotropic change* in the soft solids involved, that they have assumed a disposition for rapid oxydation—they are *active;* their relation with arterial blood has become exalted, and the blood flows to the affected part with energy; redness of the part and a higher temperature are the result. Oxydation goes on with promptness; and urea and sulphuric acid begin to accumulate in the urine. But in *congestion*, it is the reverse: the parts are then thrown into a more passive state; oxydation goes on reluctantly; the amount of tissue metamorphosed diminishes; and the quantity of urea and sulphuric acid in the urine is lessened.

Prick with a needle any point of the skin; lay for an instant the finest hair upon the surface of the eye; let a drop of vinegar fall upon the tongue, the smaller vessels immediately near become promptly distended with red blood, which their natural elasticity enables them to get rid of more or less readily, either by ordinary circulation, or by secretion or effusion. This is one of the modes of congestion which may be termed active, as implying a spontaneous dilatation of the vessels themselves by their own local, independent, vital action, under an impression directed upon their nerves or the nervous filaments in their immediate vicinity.

The passive form of congestion seems to be unconnected with any local irritation whatever; resulting, as far as we can explain it, sympathetically or revulsively from influences applied and acting upon remote organs and tissues. In ague, the cold stage of fever, under long protracted exposure to cold, and in many instances of what we call collapse, a cutaneous capillary paralysis, the fluids desert the external surface, and must be collected in the vessels of the internal organs and tissues. The spleen especially and most frequently, but the brain also, the liver and the lung, may be thus engorged with blood. Hence arise hemorrhages, hypertrophies analogous and heterologous, indurations, various degeneracies, and among the most familiar consequences, *inflammation*—a subject which we now proceed to discuss in detail.

The changes which constitute INFLAMMATION have been made to undergo the closest, most rigid and attentive examination. The observers differ from each other somewhat, both in regard to the alleged facts and the succession in which they present themselves. The minutest order of vessels, which we denominate capillary, has been most patiently watched, and with the most powerful microscopes, in order to detect the character and course of inflammatory movements excited for the purpose of experiment. The whole history of this capillary system must be confessed to be still, as in the days of Bichat, veiled in the most impenetrable obscurity. Dr. Marshall Hall describes the capillaries as a network of pellucid vessels differing from small arteries in this, that they subdivide without becoming smaller, and anastomose very freely. Forming an intermediate communication between arteries and veins, he regards them as rather passive than active canals, through which the blood is circulated by the *vis a tergo*, the impulse of the heart and larger arteries, the absorbing action of the veins, and capillary attraction. Crawford and others attribute an active circulating power to the capillaries as well as to the small arteries, and Parry denies all such power to both sets of vessels. Now, while our knowledge of the natural and healthy functions of the vascular system is so vague and unsettled, we cannot hope to ascertain clearly their diseased operations. During the several stages of the reported experiments upon the transparent parts of animals, the foot of the frog, the ear of the rabbit, etc., the most contrasted phenomena offer themselves to view. At one moment the parts are pale, at another red; at one moment the fluids pass rapidly along the vessel, at another they seem almost stagnant. How shall we decide when inflammation has begun; how determine the cause of the retarded, and the cause of the accelerated circulation? Kaltenbrunner, and after him Crawford, pretend to lay down nice and definite lines of distinction. They arrange the morbid changes under three periods, to which they affix the following titles and descriptions: 1. A period of incubation, of which they themselves remark, "that it is variable in its signs and duration." 2. A period of congestion, which they subdivide into two periods, the first characterized "by an increased activity of the vessels, and influx of blood," the second "by a labored slow circulation, arising from over-distension of the vessels and increased thickness and viscidity of the blood." 3. The period of inflammation: "Now the circulation is completely interrupted; the blood coagulates, clogs the vessels, and stagnates in several points of the inflamed part, etc. etc." Crawford further declares that "congestion and inflammation pass so gradually into one another, that they are always necessarily combined; and it may often be extremely difficult to draw a line of demarcation between them."

The obvious truth in the above statement seems to me to be this: that the congestion, both active and passive, of what they designate as the second period, and the complete interruption to circulation in the third, are mere consequences or results of the undefined changes of action and condition which have occurred during what they are pleased to call the stage or period of incubation, these earlier elements in the connected series of phenomena being confessedly too obscure and variable to allow of description.

Addison states that "the accumulation of the colorless cells of the blood, in irritated and inflamed textures, is an established fact;" the globules move irregularly, slowly oscillate to and fro, become stationary, and actually retrograde very often. Houston, having remarked upon the comparatively slow motion of the white globules in the healthy circulation, which, as he says, "lag slowly on, stealing along the sides of the vessels, while the smaller red ones glide easily in the centre of the stream," goes on in these words: "Under inflammation, this tendency to linger is increased. The white globules accumulate in the capillaries and stop up the stream, so that the mass of blood actually stagnates there: hence the rubor, calor, dolor. Whether this stoppage is mechanical, or from want of tone in the bloodvessels, or from increased disposition to attraction between them and the globules, is doubtful."

Andral, one of the greatest names which modern medicine can boast, dwells upon the extreme difficulty of properly comprehending the subject of inflammation, and proposes to lessen this difficulty, and to remedy the confusion which has embarrassed the inquiry, by a total abandonment of the word. He contends that it has been employed to express too wide a meaning, and urges the study of its elements separately and progressively. Yet he classes inflammations and congestions together under one head, fixing the attention emphatically or exclusively upon the single condition of hyperæmia—excessive presence of blood in the part. But hyperæmia is a common symptom of many conditions, both healthy and diseased. It is present in blushing; in venereal and other physiological modes of excitement, as in weeping, and in the flush of anger and of joy; in both passive and active congestions; in hypertrophies, some at least of which may be regarded as distinguishable both from congestion and inflammation; and in the uterus, first before menstruation and during pregnancy.

Prof. Bennett, of Edinburgh, maintains that "Inflammation is an exudation of the normal liquor sanguinis." In another place he says tersely: "For all scientific and practical purposes the expression 'exudation' may be substituted for that of 'inflammation.'" His error is important, as leading to an injurious therapeutic. Elsewhere he tells us, "it is a change in a part characterized by the exudation of lymph through the walls of the minute vessels, resulting from changes in the nervous, vascular, sanguineous and parenchymatous elements of that part. These changes, as we are enabled to follow them in the transparent parts of animals under the microscope, are seen to occur in the following order: 1st. The capillary vessels are narrowed, and the blood flows through them with greater rapidity. 2d. The same vessels become enlarged, and the current of blood is slower, although even. 3d. The flow of blood becomes irregular. 4th. All motion of the blood ceases, and the vessel appears fully distended. 5th and lastly, the liquor sanguinis is exuded through the walls of the vessel, sometimes accompanied with extravasation of blood-corpuscles, owing to rupture of capillaries." Now, in reading this clear description, we find nothing to enable us to understand why Prof. B. confines the term "inflammation" to the last step in a process of which indeed it is nothing more than the ultimate consequence or termination.

In the centre of the part inflamed, "in the focus," Paget says, "is stagnation; close around it, congestion, *i. e.*, fulness and slow movement; more distantly, determination, *i. e.*, fulness and rapid movement of blood." These points of stagnation—not coagulation, it must be remembered—are regarded by many modern pathologists as the characteristic or pathognomonic features of inflammation.

I am not prepared to give an unqualified assent to any one of the numerous theories of inflammation. Let us for a moment reflect upon the difficulty of constructing any hypothesis which shall explain or consist with all the observed facts, as they are not only differently described by the authorities, but acknowledged by all to vary during the several stages of the process. The circulation is at one time slower, at another more rapid! What state of the affected vessels will account for these opposite conditions? If we attribute the afflux of blood to spontaneous dilatation of the vessels (as Hunter did), we shall find it difficult to explain the slowness and ultimate stagnation of the blood described by the microscopic observers, in arteries and veins, whose powers of action are heightened, and whose functions performed with greater vigor. If, on the contrary, we regard the vessels (with Thomson) as weakened and debilitated, we shall be embarrassed to account for the accelerated circulation of the early periods, the lively sensibility, the florid redness so quickly restored after the surface has been made pale by pressure. Thomson affirms the velocity of the blood to be sometimes increased and sometimes diminished. What common vascular condition may serve as the cause of these contrasted states? Parry refers all the symptoms to an increased momentum of the blood in the part affected; but this he does not ascribe to any satisfactory cause, and has thus removed the difficulty but one step back.

For my own part, I consider every theory insufficient in its own nature, and untenable, which shall proceed upon the supposition of a mere increase or abatement, enhancement or diminution of action, excitement, power.

Inflammation is a condition essentially morbid, not in degree only, but in its very nature; and this is made equally clear, whether we refer to its consequences, its symptoms, or its causes. These causes, infinitely varied as they are, not only affect the force or intensity of action in the part which they impress, but go mainly to determine the mode which that action shall assume, and the results which it shall produce; an influence which is exerted as well by the exciting, occasional, or accidental causes, in many instances, as it is in all by the predisposing or constitutional.

In the meanwhile, the normal or physiological actions are suppressed, subverted, and substituted by the new and diseased actions, and these may be either more or less forcible than the former. Inflammation, like fever, may be either sthenic or asthenic; an alternative probably determined by the state of the system at the time, which may be either entonic or atonic. Less frequently, perhaps, it may take a local character, from the nature of a cause locally applied.

The condition of the blood in inflammation deserves attention here, as it has been supposed to throw some light on the obscurities of this dark subject. "Not long since," says Andral, in his Hæmatology, "Meckel defined inflammation to be congestion, with a tendency to new production." "The study of the blood," proceeds Andral, "shows the justness of this definition. For what else than a new production is the excess of fibrin which suddenly appears in the blood of a person attacked with pneumonia or erysipelas?" &c. This excess of fibrin to which he ascribes the buffy coat of the blood, and many of the phenomena of inflammation—is it the cause or the effect of this condition? It is "the least variable sign," yet still not invariable; for the same authority goes on to say: "Except when it occurs in anæmia, this production uniformly denotes inflammation."

Meckel's definition is farther liable to the obvious objection, that many new productions are by no means made out to be inflammatory, though they imply determination to a part, which is, I suppose, what he means here by "congestion." We cannot class all hypertrophies under this head; many tumors are indolent; tubercle itself seems to be deposited, as is shown elsewhere, independently of any essential connection with inflammation.

I am unwilling to admit the correctness of the distinction so commonly received, and, indeed, now made part of our ordinary technical language, between acute and chronic inflammations. The essential history of each is the same; the ultimate results or consequences the same. It seems unscientific, then, if not idle, to attempt the establishment of any pathological distinction upon the mere difference of time occupied by the several steps of the processes gone through. "Notæ veræ inflammationis," says Celsus, "sunt quatuor; rubor, et tumor, cum calore, et dolore"—pain, swelling, heat, and redness, to which is sometimes added throbbing. The increased heat of an inflamed part has been the subject of much dispute. As we do not clearly understand the physiological generation of animal heat, we cannot always explain why the part diseased seems so unnaturally hot, for there is rarely wanting, either in external or internal inflammations, a positive sense of increased heat. Hunter seems unwilling to allow that it ever rises much above the natural temperature of the trunk of the body, or the central part, which he supposes to be at or about 98° Fahrenheit. He did not meet with it, he says, above 101° or 104°. Crawford and others have seen it as high as 106° and 107°; and, in scarlatina, it is affirmed to have reached 112°. I would ascribe it to the increased activity of circulation, and the greater quantity of blood sent to the inflamed part. It seems partly to depend, both here and in fever, upon the suppression or obstruction of the secretions and excretions—the sensible and insensible perspiration, etc. Liebig attributes it, chemically, to the transformations of tissue, which give out so much caloric previously latent. But we have numerous and striking examples of analogous rise of temperature, independent of inflammation or any known changes or transformations; as in the burning blushes of the modest or guilty cheek, the heat of the genitals under venereal excitement, and that of the vagina during parturition, which, according to Granville, has been found as high as 120° Fahrenheit. Pain, as a symptom of inflammation, is generally declared to depend upon the nervous irritation present; but the exact mode of this irritation is not pointed out. The tension occasioned by the afflux of fluids, and the consequent swelling, must undoubtedly increase very much, if, indeed, it does not give rise to, this pain, which is said to be often proportioned inversely to the extent of the swelling, being apt to be most severe in structures which do not readily admit of distension. We can hardly, however, go far wrong in attributing pain to the occasion of any new, unaccustomed, or unnatural condition of any part, or change in the state of an organ, especially if such change be great or sudden. Thus, we observe in what are called chronic inflammations—which proceed slowly, often resulting ultimately in marked alterations of condition and structure—that little or no pain is complained of; as in some cases of psoas abscess, spinal disease, and the insidious forms of phthisis.

The redness depends obviously upon the dilatation of the smaller vessels, and the admission of perfect red blood in undue quantity, and into tubes not previously adapted to the reception of the globules and coloring matter—as the whole conjunctiva is injected in ophthalmia. Thus, also, we account for the throbbing which may occur; unusual pulsations are felt in arteries now, for the first time, enlarged sufficiently to receive the current of blood propelled directly by the systolic impulse of the heart. Formerly capillary, they admitted only a serum or colorless lymph, or rather, perhaps, absorbed and transmitted it in a steady current, without pulsation. The throbbing, however violent locally, is always synchronous with the pulse.

Inflammation produces certain notable changes in the fluids. 1. Hyperfibrination of the blood, of which we know not whether to pronounce it cause or effect, or how to account for it. 2. Buffiness, or sizyness, already spoken of; and, 3. The formation of pus. This is a new production. Simon describes pus-corpuscles, often found mingled with the blood, as well as effused on surfaces and collected in abscesses, to be half as large again as blood-corpuscles, of a pale gray color; their edge is granular or tuberculated; their shape is round or oblong; they are slightly granular in the interior, indicating from three to five nuclei.

Every portion of the body, while living and supplied with nutrient vessels, is liable to inflammation. The hair itself is inflamed in plica; a malady scarcely known, except in Poland, though some rarer cases of it are recorded as occurring in natives of other countries. It attacks the lowest and filthiest class of Poles, whose hair becomes matted, thickened, softened, and entangled together, so as to form a foul and hideous mass, which, they tell us, is from time to time loosened and thrown off. A case is related by Larrey of preternatural sensibility of the hair in a French soldier—probably an instance of slight or incipient plica.

The cuticle is not exempt from morbid affections of which inflammation is, at least, an element. I have seen herpes occupying for years, most superficially, the delicate epithelium of the lip, and productive of very considerable pain and irritation. The nails, around their roots and edges, as far as the remotest vascularity reaches, are subject to obstinate and tormenting inflammation. The various exanthemata reside in the cutis vera, and seem to derive their peculiar characteristics rather from the cause which produced them than the texture of the part which they occupy. The cellular tissue is the seat of phlegmon and carbuncle. The former is circumscribed by the deposition of adhesive lymph around the abscess in which pus is effused. This deposition partly—Gendrin says exclusively—forms what is vulgarly called the core; a portion of which consists of sloughing shreds of the cellular tissue. In carbuncle, this sloughing is frequently very extensive, and there is no disposition to limit the effusion by fibrinous adhesions.

Serous membranes—the pleura, peritoneum, and the meninges of the brain—are very liable to inflammation. In its progress, their delicately smooth surfaces become roughened, and coagulable lymph exudes, which is organized by the formation of vessels, and constitutes the medium of a permanent union between them. They also effuse serum and pus, of varied amount and appearance—as in empyema, hydropleura, etc.

Mucous membranes—of which we distinguish three large tracts: that lining the nose and respiratory apparatus, that of the digestive tube, and that investing the urinary and genital organs—are the seats of some of the most important and familiar phlegmasiæ. The changes induced upon these membranes by inflammation must be carefully studied. The villous surface is first reddened by injection of its vessels; becomes swollen or thick, and somewhat rough and rugous; its secretion is more abundant and thinner, sometimes, as in coryza, acrid and irritating; lymph or fibrin is, in certain cases, thrown out, as in diphtherite, croup, and diarrhœa tubularis, and may be organized by the formation of small vessels adhering as a pseudo-membrane. Pus very often exudes from inflamed mucous surfaces, as in bronchitis, dysentery, and gonorrhœa. Vesicular protrusion, or pustulation, also affects the same parts—as in aphthæ and smallpox, and (as Horner affirms) in cholera, and (as Watts declares) in pertussis. Ulceration is one of the ordinary events of inflammation of the mucous membrane. Absorption is among the usual changes described by Kaltenbrunner, and goes on concurrently with effusion of lymph and suppuration. When the first of these processes predominates, we have an ulcer, to which, indeed, all the tissues are more or less liable.

Dothinenteria, ulceration of the intestinal mucous membrane (first correctly described by Bretonneau), is a very common attendant of protracted fevers. It may occupy the villous membrane in general, or the orifices of the mucous follicles or the glands of Peyer. Though usually shallow, it may erode the intestinal tissues. Chomel inclines, however, to think that the parts give way under gaseous distension. Ulceration of the throat and mouth is unhappily a very familiar form of disease; it is, perhaps, less frequently seated in the respiratory tube, but is occasionally met there, as in chronic laryngitis. I had presented to me by a friend, under whose care the patient died, the larynx of a child into which ulceration had extended from the tonsils and trachea, while in other points the adventitious membrane above spoken of was still adherent.

The cerebral tissue is liable both to indurative, lymphid effusion, and softening from absorption. These degeneracies of structure are of course attended with corresponding impairments of function. Pus and serum are, at times, abundantly poured out from the membranes of the brain, on its surface, and in its cavity, and thus we have the result of mechanical pressure complicated with or substituted for those of inflammation proper.

The fibrous tissues, which present a great variety of anatomical arrangement, offer similar variety in the modes of inflammation which affect them. Rheumatism is among the most prominent of these. It attacks the muscles, the tendons, and aponeuroses, the capsular ligaments of joints, and the periosteum of bones; even the skin is liable to its invasion. Carditis is known to be very often rheumatic. In rheumatic inflammation, suppuration rarely occurs; the vessels throwing out usually a gelatinous or serous effusion, or, perhaps, depositing earthy matter. In one patient, however, I met with abscess in two places—near the knee-joint, forming under the ligament of the patella and around the middle finger. The same parts are liable also to arthritic inflammation, an acutely painful modification of the disease, paroxysmal and obstinately recurrent. In gout, suppuration is as uncommon as in rheumatism; the vessels affected here deposit, especially about the smaller joints, an earthy concretion, phosphate of lime, etc.

The complex tissues of the glands and internal viscera, are subject to a diversity of modes of inflammation, which may terminate in abscess and ulceration, with extensive loss or "melting down" of the original parenchymatous structure; or there may be, as formerly stated, mere atrophy or silent absorption. But the more common and interesting change occurring in these organs, consists in a hardening or induration—a scirrhous state, as it is generally phrased. This is supposed to depend chiefly upon the deposition of lymph or fibrin among the molecules of the parenchyma, and in the cellular interstitial membrane. Of course the functions of the part are thus impeded. There may be also, at the same time, a form of hypertrophy with great enlargement.

Ulcerative absorption, already treated of in a cursory manner, is singularly susceptible of modifications from cause, being either simple or specific. We call it simple, when consequent upon ordinary inflammation, or induced by long continued pressure, the application of intense irritants, corrosives, etc. It is specific, when it is the result of a cause of peculiar character, contagious or epidemic, as in syphilis, cynanche maligna, and the like. I have already mentioned the frequent occurrence of ulcers upon the mucous membranes, and especially that of the digestive tube. Young infants are extremely liable to aphthous affections, as cause or consequence (for this question is not easily determined) of many disorders of the bowels. In numerous individuals, the whole life is tormented with painful and irritable ulceration of the cheeks, gums, lips and tongue, which, in some, seem the mere effect of local influences, but in others, clearly connected with general derangement. Ulcers, attacking the stomach itself, sometimes perforate all its tissues; and again, burrowing deeply, while its substance is thickened by surrounding inflammatory deposition, they interfere with the performance of all its important functions, and render the existence of the patient an oppressive burden.

The surface of an ulcer, though formed by absorption, is a secreting surface. The fluids thrown out differ according to the nature of the cases. A simple ulcer discharges pus mixed with serous, and perhaps sanious matter.

Specific ulcers secrete a peculiar fluid possessing characteristic vital properties of a morbid nature, such as contagiousness in contagious disease.

Ulcers are either indolent and stationary, or progressive and irritable, or disposed to heal. In the first instance, the acuter degrees of inflammation with which they were originally connected, has subsided, and left them callous and insensible, perhaps by a free deposition of mere lymph, which, from defect of vascular action, does not become organized, and is silently removed. They are progressive in various ways—by a predominance of the absorption which originally caused them; by a sudden and vehemently excited action of the absorbent vessels, attended with high irritation and inflammation of the surrounding parts, as in the corroding ulcer of the uterus described by Clark; and by the loosening of successive sloughs from the surface. Ulcers presenting the last two phenomena are called phagedenic, and are destructive to a degree of which an idea can hardly be given. Thus may be destroyed every tissue of which the human body is composed, as in carcinoma and lupus, which attack and remove successively skin, cellular membrane, fascia, muscle, bloodvessel, absorbent, nerve, and bone. Yet, in one, at least, if not in more, of these modes of ulcerative inflammation, this corrosion of the part is often accompanied by a collateral or coincident morbid action of a contrasted tendency. "In a cancerous tumor," says Clark, "the deposit of new matter more than counterbalances the effect produced by the action of the absorbents, and the thickening and the destructive process proceed simultaneously."

The healing of ulcers is a phenomenon of much interest. The cavity formed is filled up, and the lost substance replaced by the growth of granulations. These are red points and eminences of a glossy shining appearance. They are supposed to be formed by and of coagulable or organizable lymph, into which the vessels that have deposited it extend themselves: thus, it becomes highly vascular, and grows quickly. These separate points approaching, adhere to each other, and when at last they have attained the level of the original surface, become covered with epithelium or cuticle, thus cicatrizing.

This filling up is never a perfect reproduction. An external eschar is never precisely identical with true skin; the villi of mucous membrane are never re-formed on the cicatrices; lost muscle is supplied by a dense cellular or tendinous substance; and even bone, though replaced by an earthy deposit, similar in chemical composition, wants the nice cellular arrangement of the original, and can easily be distinguished from it.

Mortification is the worst and most deplorable of all the local effects of inflammation. It is briefly defined to be "the death of the part affected." but the idea thus conveyed is somewhat inaccurate as well as wanting in precision.

A part in which mortification has occurred, is by no means in the same condition as if simply dead, that is, a portion of a dead body; for mortification is as easily distinguishable upon a corpse as in the living patient; but it is a peculiar mode of disorganization, of which death is the uniform coincident, or the essential consequence. The words gangrene and sphacelus, then, must be understood to imply always disorganization as well as death. These ideas are by no means necessarily or invariably connected. Many modes of disorganization are consistent with the continued vitality of the part, as in the widely diversified structural degeneracies met with in all the tissues, and forming parts of the history of carcinoma and fungus hæmatodes. Mortification being thus the ultimate result of many series of diseased actions, will present appearances somewhat different, in accordance with the diversity of causes to which it is owing. As eschars from various modes of ulceration are familiarly known to be unlike each other, so the sloughs from heat, from cold, from spontaneous gangrene, from the use of ergot as food, etc. etc., are all described as peculiar and characteristic. The occurrence of mortification is often, if not most usually, to be explained by reference to the state of the constitution; thus, it is most likely to attend inflammation in low debilitated subjects, in typhoid fevers, and in the diseases and accidents of old drunkards. When it is about to ensue, the part becomes of a purplish red, the swelling loses its firmness and elasticity, and is soft, flaccid, and doughy; on the skin, vesications appear, and the hue grows darker and darker to perfect blackness. On mucous surfaces, as in the mouth and throat, the gangrenous points are of a gray or ashy color. Very generally, though not always, sphacelation commences with an increased intensity of pain, mingled with sensations of heat and burning, but this augmented sensibility soon declines, and is totally lost.

Different tissues are, in various degrees, susceptible of mortification. The mucous membranes and the skin seem to be most liable to it. Bone is frequently attacked with caries and necrosis. The extremities are subject to dry gangrene, a disease well described by Pott. Parts thus deprived of their vitality, if their integrity be not essential to the continuance of life, and if the general system retains any considerable portion of its vigor and energy, are soon separated from the living substance to which they were attached, and thus loosened, fall, or, as we phrase it, are thrown off. The process by which this is effected, is called sloughing, and is generally spoken of as the result of the action of the absorbent vessels in removing the layer of living tissue originally in contact and connection with the dead matter. I would rather ascribe it, at least in great part, to the coincident secretion or effusion from the extreme vascular points of the living substance, which must now resemble, in condition, the surface of an ulcer pouring forth pus and serum, and thus detaching, thrusting away, and washing off the dead fibres and molecules of the mortified mass. This result of inflammation is comparatively rare in the parenchymatous viscera. I have, however, seen gangrene of the lung, liver, and spleen, and gangrene of the cerebral substance is mentioned by writers.

In considering, as we proceed briefly to do in the next place, the controlling and modifying influence of the causes of inflammation, it is proper to subdivide them into the predisposing and exciting. Predisposition may be local or constitutional, permanent or temporary, but if existing in any notable degree, its force is almost resistless in determining the form, character, and result of inflammation. Thus, in a gouty system, whether the arthritic diathesis be hereditarily derived or newly built up, any accidental excitement will produce a characteristic paroxysm. A blow upon the foot, a twist of the ankle, or any other general cause of inflammation will bring on a well-marked and specific attack of gout. Thus, also, in the strumous habit, scrofulous affections of the eye and of the glands, of the knee and hip-joints, will arise from slight and common causes, and follow a peculiar and but too familiar track. In rheumatism, it is known that a first attack always leaves the patient more liable to a second, and that this proclivity is increased by every repetition. In this and the other numerous instances of an analogous nature, it seems probable that some obscure change has been impressed on the local structure. I need only allude here to the temporary predisposition resulting from recent, and, it may be, transient circumstances, shown in the prompt blackening and gangrene of a pressed or an excoriated or blistered part in the typhoid fevers. You have all remarked, doubtless, in the most trivial wounds of certain individuals, an unwillingness to heal, a tendency to take on painful induration, suppuration, ulceration. This is a very frequent annoyance to the intemperate, who are in this way singularly liable to erysipelatous extension of inflammation from any ordinary source; to carbuncle also, etc.

2. Of the modifying influence of the exciting cause of inflammation, it must suffice to offer a few examples. Heat is among the most common of these, and the most characteristic point in the history of its effects is the strange and unfortunate tendency to contraction of the cicatrix, which distinguishes the eschar of a burn from all others. Cold alone produces pernio or chilblain. Baker's itch arises exclusively from the application of dough or fermenting flour to the hand. Cancer scroti shows itself only in chimney sweeps, as the effects of soot adhering to loose folds of skin. Tartar emetic, when rubbed on the surface, produces an eruption closely simulating variolous pustulation. Croton oil, mustard, pepper, cantharides, every separate irritant, indeed, whether its action be simply acrid or chemically corrosive, may be affirmed to possess an energy absolutely peculiar, and exclusively characteristic, no two of them giving rise to inflammatory processes of similar or identical nature when applied to any part of the body; and also of the secretions of contagious disease, each excites a specific and peculiar malady which cannot be mistaken or counterfeited.

Having thus spoken of the direct results of inflammation, and of the modes in which it is impressed by the structure or anatomical contexture of parts, on the one hand, and on the other by the character of the causes which give rise to it, let us, for a moment, consider the nature and influence of these modifications, as exhibited in their sympathetic effects upon the general system. The degree of pain, I have said, observes an uncertain proportion to the inherent sensibility of the tissue affected; the suddenness of the changes going on; the character of the cause producing it, and the constitutional susceptibility of the patient. When intense and protracted, it may prostrate the subject suddenly and irrecoverably, by a directly exhausting influence on the sensorial system; its influence is frequently productive of syncope and nausea; and when the strength is less impaired, of cramps, convulsions, and delirium.

The derangement of physiological function of any part, is a necessary effect of its inflamed condition, and of the impairment or deterioration of structure which may result, as when we have deafness from otitis, blindness from ophthalmia, atrophy from induration of the mesenteric glands, etc.; but besides this, there is a frequent diffusion or extension of mischief sympathetically; as, when the stomach refuses to perform its offices, on account of inflammation of the duodenum, liver, pancreas, or spleen. Yet these consequences, both direct and symptomatic, are occasionally evaded in a manner difficult to be understood, and we detect unexpected lesions, in post-mortem examinations, in parts and organs which had exhibited no impairment of function.

Of all the sympathetic effects of inflammation, however, that general disturbance of the organism to which we give the name of *Fever*, is the most interesting. Arising from almost every form and circumstance of inflammation, however caused, and wherever located, it assumes two distinct and well-known types. The first, commonly designated inflammatory symptomatic fever, supervenes early in the case, while the immediate influences of the accidental injury, or other efficient cause, are urgent, and while the vigor of the patient is unabated. It is a continued fever, exhibiting little or no remission. We see it daily following a severe blow, a fracture, a dislocation, a sprain, a wound, a surgical operation. It belongs, too, to the history of the acute phlegmasiæ. Its violence is said to be generally proportioned to the sensibility of the part and of the constitution, and to the intensity of pain suffered by the patient; as we often witness in ophthalmia, otitis, and orchitis. But these elements do not stand in the relation of cause to it; for neuralgia, one of our most acutely painful affections, is seldom or never attended by it, and Travers records its frequent absence in cases of irritable breast and testicle. Objection has been made to our applying the same phrase—"inflammatory symptomatic fever"—to denote the condition which arises from inflammation of a spontaneous character—the acute phlegmasiæ, pyrectic affections—and that which follows mechanical causes—wounds, accidents, and injuries of whatever kind. As far as the history of the phenomena can go, however, to make out the pathological identity of the two, it must be considered as established. The chill or rigor so often, though not uniformly, the invading symptom, the heat and dryness of skin succeeding, with thirst, pains in the head, back, and limbs, disturbance of sensorial and circulatory functions—in short, all the elements which constitute fever in all its forms, are here collected. There is, nevertheless, one striking discrepancy which deserves notice. In cases of external causation, the febrile disturbance of the constitution does not show itself until a notable interval has elapsed after the infliction of the local injury, appearing, indeed, to be gradually developed. When connected, on the other hand, with the several phlegmasiæ, it would seem to invade simultaneously with the local inflammation. Thus, in pleuritis, enteritis, phrenitis, &c., fever, if not among the very earliest symptoms, shows itself so soon after the first pain is complained of, that no notable interval can be marked, for the most part. Hence, it may be reasonably doubted whether, in the pyrexiæ, the local and constitutional derangements stand in the relation of cause and effect to each other, as has been, by some pathologists, so positively taken for granted; and whether it is not more consistent with the order and connection of the observed facts, to regard them rather as coincident effects of the same efficient cause. Let us refer, for an illustration of this view, to one of the exanthemata. In smallpox, taken in the natural way, we have first fever, then local inflammation, and again fever, now plainly symptomatic, and dependent upon the extent of cutaneous pustulation. Nor does the degree of fever seem always to be proportioned to the violence of local inflammation, in any of the pyrectic affections.

It is interesting to remark further, but very difficult to account for, the diversity in the train of special symptoms connected with, and apparently dependent upon, the various inflammations of organs and tissues.

In phrenitis, pleuritis, and carditis, for example, we have a full, hard, bounding pulse, and the system of the patient seems to retain all its organic force and resiliency. In gastritis, and enteritis, and peritonitis, on the other hand, the pulse is small, and oppressed, and irregular, and the patient sinks rapidly, with great muscular weakness and sensorial prostration.

2d. The second form of symptomatic fever above alluded to is known as hectic; is of intermittent type; may also arise from almost all sources of local inflammation, but does not occur in their early or acute stage; connecting itself exclusively with the chronic or subacute inflammations, and the insidious, such as disorganize and destroy by slow degrees; and rarely or never makes its appearance until the system has lost much of its powers of action and resistance by protracted suffering or profuse loss of fluids. It was formerly ascribed specifically to the absorption of pus, but this notion is now obsolete and abandoned.

PERIODICITY.

Periodicity, or the tendency to observe a regular and well-defined routine in their course, is a property or quality which may be ascribed, perhaps, with little or no impropriety, to a large majority of the long catalogue of human maladies. Their general progress, their increase and decline, will be found, in the mass of examples, to bear a more or less precise reference to the process of time occupied in the development of the several changes of condition in which they consist. They remit or intermit; the patient grows worse or better; they reach a determinate acme, and come to an end favorably or unfavorably.

These periodical changes or revolutions in the history of disease are, indeed, among its most singular and impressive phenomena, and the physician who does not pay a due and careful attention to them, will make little advancement in the practice of the art of healing. Hence, I have been led to regard them as worthy a separate consideration in this relation.

The system is subject, in a state of entire health, to diurnal revolutions of great regularity. We govern ourselves in all our habits and customs, whether personal or social, as if instinctively, by the progression of the hours. The disposition to sleep comes on at nightfall; we wake after a certain time, and rise in the morning, from the posture of repose, newly prepared for the ordinary duties of the day.

The pulse is found by experimenters to vary notably in frequency and force, when compared in the morning, at noon, and again at evening. Plants are said to sleep; and, if this idea be deemed fanciful, we know it to be a fact that their respiration, so to speak—their action upon the atmospheric air—is different by night and by day; whence we have a right to conclude, that an analogous difference in the functional action of the skin and lungs holds good in the life of animals also, especially if we reflect on the well-known and extensive chemical influences of the sun's rays. It would be strange, indeed, if every function and organ of our susceptible organism did not respond harmoniously to the play of light and darkness—of night and day.

"The influence of cosmical relations" upon the actions of the human system, says Henle, "cannot be denied." These relations, therefore, should be diligently studied. The most obvious of them have been already referred to, and their familiar influences. But there are others not less uniform or influential, probably, whose agency is obscure. There is, for example, a regular diurnal fluctuation of barometric pressure, of which Humboldt tells us: "The regularity of this ebb and flow of the aerial ocean, I have found undisturbed either by storm, tempest, rain, or earthquake; on the coast, and at 13,000 feet of elevation."

The hygrometric conditions of the atmosphere must vary regularly with tidal movements wherever these are notable; the flood offering a larger space and quantity of water for evaporation, the ebb a greater exposure of drying surface. With the amount of aqueous vapor in the air there must be also a modification of its electrical states.

The lunar revolutions, the moon's months, are completed in about twenty-eight days. The solar year consists of very nearly thirteen such months.

Laycock's "basic unit" comprises a lunar or barometric day of twelve hours; marked by one maximum and one minimum variation of the barometer. This period doubled is the solar day of twenty-four hours; this is the quotidian period of pathologists; quadrupled it is the tertian period: "a lunar week is the quartan period." Fourteen lunar days make up the hebdomadal or heptal cycle; this period of seven solar days, governing or at any rate coinciding with an immense number of recognized phenomena. The eggs of small birds are hatched in two weeks; of the gallinaceous tribes in three; of the duck in four; and of the swan in six weeks. Heat, menstruation, and utero-gestation, follow in the mammals this heptal law. So do the acute diseases affecting the human constitution, as far as we can trace them.

It may, indeed, be laid down as a positive rule, that all diseases have their definite periods of access, of duration, and of rhythm or regular progression. I know that Henle and others, looking at the familiar division of maladies into acute and chronic, have separated them accordingly into the typic and atypic, regarding the latter class of chronic affections as essentially atypic or irregular, and unobservant of any rhythm or measured mode of progression. I am not prepared to prove that there are no atypic forms of disease, but all analogy is against the assumption; and I deny that time or mere protraction is incompatible with rhythmical exactness of alternation and interval. In protracted intermittents, we observe the return of the paroxysm for years at the precise time at which it is calculated and expected. A case of headache is given by Trousseau and Bonnet, which returned at the same interval for twenty-five years; and many instances of similarly curious character might be easily collected in the books.

Besides this, we easily trace the type or changes, or alternations, recurring or reappearing soon and often in acute disease; but of the chronic, we must say, as Humboldt does in his Kosmos of the great cycles of physical nature, that "periods of unknown length lose their periodicity to the observer."

It is but recently that Olmstead announced the periodical occurrence of meteoric showers in August and November, and Birt, the annual oscillation of a great atmospheric wave in November, and Clarke, the "positive periodicity" of storms and earthquakes.

I have already stated the correspondence of almost all normal actions with diurnal periods. This is both organic and voluntary. The pulse varies as Guy and Knox have proved at stated times of day. Prout tells us that more carbonic acid is formed in respiration from daybreak to noon, and less during the remainder of the twenty-four hours. Schweig shows that there are regular daily variations in the composition of the urine. We sleep best concurrently with the coming on of the dark hours, and wake with the returning dawn; but the same regularity of sleep and waking is said to be established in the arctic regions during the long nights and the days of protracted sunshine.

Habit, too, which in the strong phrase of the Duke of Wellington is "ten times nature," soon runs, as we see, into regular periodic alternation of action and interval, which interweaves itself inextricably into the course of life, and influences, and modifies the performance of all its functions.

We are prepared to appreciate, I think, the existence of two great sources of periodicity as a pathological phenomenon: 1st. Conformity to or harmony with the innumerable movements and changes of universal nature which surround us, and of necessity impress us; and 2d. The special or specific trains of movement belonging to and inherent in diseases themselves, and constituting an essential portion of their very nature. Each has its own characteristic period of incubation; its own time and mode of access; its own duration and termination or decline; if paroxysmal and recurrent, its own latent period.

I do not now stop to argue the question of the relation of these phenomena to the assigned causes—insolation, lunation, habit, or to malaria or contagion acting or supposed to act. Suffice it here to say, that the coincidences are undenied, undeniable, and vastly numerous.

As to their *access;* in general we know the facts simply, without even a rational conjecture as to their relevancy. Hectic fever comes on both in the morning and evening, and seems to have some reference to points of time, at which the pulse in health is excitable and accelerated. So also the exacerbations of continued fever are said to present themselves at the same hours. But a quotidian comes on earlier than a tertian, and a quartan later. Malarious fevers never make their invasion at night; yellow fever in the same latitudes, and under very similar circumstances, very often does. Croup and asthma attack the subject soon after the dark hours cover us, before midnight; colic and cholera after midnight, between it an sunrise. Moore tells us that in the Mediterranean, he "constantly remarked that influenza, diarrhœa, and cholera, when epidemic on board ship, show themselves for the most part very early in the morning."

It is probable, too, though it has not been proved, that the period of *incubation* is also definite in each, and subject to the government of established laws. But these are numerous and diversified, and are likely to modify each other so that the result—though not capricious, but determined absolutely—shall not be predictable, because all the elements are not known, and cannot be calculated. Thus, when we inoculate with smallpox matter, we expect a local inflammation to arise on the third day, and certain constitutional disturbances to follow at a well-known rate. But accidental exposures to impalpable contagion do not allow of such precise calculation and prediction. Indeed, they vary unaccountably. Yet there is an ascertained average. Without supposing any variation in the action of the law, we may imagine many modes of explanation. Predisposition is a very important element, whose force it is difficult to estimate; and we are too apt to speak of it as a positive condition, which admits, by its absence, of a mere negative state. This is not enough, I think, and we shall be driven by a study of the facts to acknowledge the existence of a contrasted or incompatible state, the correlative and opposite of what we call predisposition, which is capable of arresting, suspending, and, while it lasts, preventing the development of the specific effects of a morbid cause, thus protracting apparently for an indefinite length of time the latent period. To illustrate my meaning, I would refer to the long suspension of the germinative tendency of seeds deep buried in the earth, which obey readily their own laws of reproduction when restored to air and sunshine; and the still more remarkable instances of similar suspension in the seeds and bulbs found within the cerements of Egyptian mummies.

Concentration and intensity give promptness of efficiency in some well-marked examples, by breaking down whatever opposed modes of healthy action may present resistance, and, aided by fostering circumstances, may hasten the period of access somewhat, as the germination of plants is forced in a hot-house. Still, we are obliged to acknowledge the influence of a general law, however disturbed with occasional anomalies and apparent exceptions.

Periodical fever usually follows exposure to malaria within the fortnight; it is very rarely postponed beyond three weeks; yet there are numerous cases on record in which the subject has been attacked after the interval of some months. Hydrophobia presents a wide range; seeming to lie dormant within the body for a few weeks, or, as is alleged, for many years, and then bursting forth into an energy of malignant action that knows no cessation or control.

The *duration* of diseases is fixed and characteristic, but appears altogether arbitrary. We can no more explain why one malady shall last one week and another two, or four, or six, than why an ephemeron should live but a day and a raven a whole century and more; or why a flowering shrub should perish within a week, and an oak and a baobab defy the storms of a thousand years.

Much has of late been written concerning self-limiting diseases, so called. It is perfectly well understood that several of our most common maladies run a given course, and terminate at a given time and in a definite manner, which can be calculated and predicted with a reasonable degree of certainty, as not liable to be interfered with or disarranged by any ordinary contingencies. Thus, rubeola comes to a spontaneous termination in the great mass of cases, increasing, attaining its acme, and subsiding within eight days; and a similar statement may be made concerning the other exanthemata—that they progress, grow worse, reach their height, decline, and disappear with entire regularity, and in a familiar mode of progression. Now, let it be observed that these affections are self-limiting, in the most explicit and correct meaning of the term. They are absolutely independent of all fostering or favoring circumstances, of all reapplication or continued action of the cause which produced them; we cannot protract their specific morbid action for a day. It will come obstinately to an end, and totally pass away. This is self-limitation, properly so called, and belongs to a special class of morbid affections.

The term, however, has been misapplied to include a large number of diseases upon the alleged ground of their indomitableness, their obstinate tenacity, their refusal to yield to our remedial applications. The list of self-limiting diseases thus made is a long one, and includes certain malignant ailments, on the one hand, absolutely incurable, such as cancer and hydrophobia, and on the other a great number, which, while they exhibit a general tendency to subside after a brief period, occasionally extend themselves, we know not why, almost indefinitely. Thus, pertussis may last "from six weeks to six months;" typhoid, from a fortnight to eight weeks or more; yellow fever, from three days to three weeks; pneumonia, from eight days to a month; and dysentery, from a few days to many years.

I object to this misapplication of terms, as leading to inferences most dangerous and unwarrantable, directly tending to the establishment of the expectant system of therapeutics, or, at any rate, a feeble and hopeless and stationary view of practical medicine. It is acknowledged, on all hands, that we cannot pretend or even attempt, in the present state of our science, to arrest the course or cut short the progress of smallpox and its kindred affections. If we class with them, as some writers of high respectability and authority have done, pneumonia and the other phlegmasiæ, rheumatism and gout, all the obstinate, irregular, and incurable disorders, such as asthma, angina pectoris, epilepsy, mania, and a great many others which have been named here, we shall be led, by logical reasoning, to the abandonment of all curative measures, and trust, as in the treatment of the exanthemata, to rational employment of palliatives and proper regimen. Surely this position cannot be for a moment maintained. The miscellaneous collection which I have enumerated from the authors to whom I refer, contains a great diversity of morbid conditions which differ greatly in history and character among themselves, and even in different examples of the same name offer great variety. Some of them are, in a certain proportion, amenable to our efforts, and yield to the improving skill and expanding resources of the profession; while others again are, as we lament is but too often the fact, totally unmanageable, whether essentially or from coincident circumstances, and absolutely unlimited. In no sense, then, are they entitled to be placed under this category.

It is a pleasant reflection, too, that, however slow, there is certain and positive progress made in our therapeutical interference with disease. Intermittent fever, formerly tenacious if not often fatal, is now a malady of short duration everywhere—thanks to the scientific skill of the chemists who extracted the febrifuge principle in concentrated form from its vegetable source, and the boldness of the practitioners who ventured upon the free doses now so common and familiar. Remittents, too, are frequently "jugulated," as the French phrase is, suddenly and abruptly arrested by the same means, as they formerly were, though far more rarely, by the lancet, the cold bath, and mercury. There is abundant testimony that the justly dreaded hæmagastric pestilence has, in some of its most insalubrious localities, as in Demerara and British Guiana, yielded to the combination of quinia with mercury; and many physicians in our country are firm in their belief of the prompt efficacy of this abortive treatment. Gout and rheumatism have long been opprobria and stumbling-blocks to our profession. Podagra was trusted to "patience and flannel," and the sufferer was taught to console himself with the belief that he had purchased "a new lease of life" at every access, although, as one of its martyrs complained, it might be "at a rack-rent." But now we strike at it boldly, and often successfully; both with rational treatment and empirically; correcting the acid acrimony of the secretions with proper alkalies, and both alleviating and shortening the paroxysm by colchicum, veratrine, and the patent formulæ of Husson and Wilson. Of rheumatism we may also say, with some well founded complacency, that the more recent management by lemon-juice, the nitrate of potass, and the other alkaline and neutral salts, has enabled us both to diminish the suffering and abbreviate the course of the attack. In regard to typhus and typhoid fevers, so confidently referred to as proving the illimitable character of disease and the inefficiency of medical treatment, except as a palliative, I think the remark above offered will also apply fairly.

When I compare on any large scale the result of the merely palliative or expectant management with those of the perturbing, Hamiltonian, the mercurial or the eclectic, I am satisfied that there is a very great difference in favor of the latter generally. I do not speak now of the comparative mortality, although I believe it to be decidedly lessened by any plan of active treatment carried out with moderate prudence and judgment—that question is irrelevant here; it is of the average duration of cases that we are to inquire, and I have no doubt that it will be found to be materially lessened. Few will deny that the mercurial treatment when well adapted and efficiently pursued will occasionally, many affirm will *often* substitute a new and transient infliction of brief existence and spontaneous subsidence, which will supplant and set aside the original train of morbid actions so full of danger and injury. It will suffice to set in a clear light the broad distinction between the two classes of disease which are confounded together by the misuse of terms against which I am protesting, to make the same experiment with any case of true and properly self-limiting character, smallpox or scarlatina, for example, or measles; in either of these we shall surely find ptyalism a gratuitous, most useless, nay, a positively injurious addition to the essential phenomena of the disease, none of which it will either check or modify, and to the sufferings of the patient; neither shortening nor prolonging, controlling nor enhancing the characteristic symptoms.

Notwithstanding all the admirable patience and indefatigable diligence of Louis, the profession has not come to repose an implicit confidence in his medical observations, or rather, not in the therapeutical conclusions he has ventured to draw from them. In spite of all the array of tabular proofs that the true phlegmasiæ and inflammatory affections generally, will run a fixed course unchecked by the interference of art, I presume it will be difficult to find a physician who is not convinced of his power to cut short pleurisy and pneumonia, enteritis and dysentery—at least, in some instances, at their commencement and under favorable circumstances—by means of the lancet or quina, or mercury, or opium, or some other remedy in which he has learned to trust.

It deserves to be remarked that as we have found our examples of the truly self-limiting diseases among the exanthemata, so the doubtful or debatable will include for the most part such as have had a place assigned them at different times and by different authorities among the eruptive fevers. Here, for instance, are typhus and the typhoid affections, of which some affirm and others deny the essentiality of the cutaneous efflorescence; pertussis or hooping-cough, which Watt declares to be attended with a characteristic eruption on the bronchial mucous membrane; yellow fever, which Hildebrand and others regard as an exanthem, and which presents, certainly in a proportion of cases, varying in different seasons, some such complication incidentally or otherwise; cholera, of which Horner asserts the coincidence of a vesicular eruption on the gastric and intestinal mucous surface, and many others describe as accompanied by a cutaneous eruption; and erysipelas, now looked on by a majority among the eruptive fevers, though long denied such place.

The progress of diseases is either continuous and simple, or it is interrupted by intervals. The latter constitute a very interesting class of maladies, known as paroxysmal and recurrent. The paroxysm may deserve, in relation to our present topic, a separate consideration, as being of separate character. Thus the paroxysm of an ordinary intermittent fever may be properly termed self-limiting, typical in the phrase of Henle, while the disease itself, looking to any imaginable tendency to a spontaneous subsidence, must be denied any right to that title, being absolutely atypic, and remarkable on the other hand for a most tenacious adherence, a persistent tendency to recur endlessly, to engraft itself upon the constitution, indeed, as a fixed habit, a second nature. The same thing is true of epilepsy, the paroxysm of which, horrid in aspect and terrible to suffer, is yet of brief duration—self-limiting in many senses; but so far as a tendency to recur is an element of the disease, truly illimitable—nay, gaining a stronger and more obstinate hold upon the system with every repetition of its dreaded access.

Periods of *rhythm* in disease measure the recurrence of repetition of the same or similar events. Many of these periods of which I have already spoken are diurnal, or correspond with diurnal movements, either of external nature or of the organism; either original and constitutional, or impressed by habit. But we are equally familiar with the septenary period—a coincidence which seems not quite so obvious or easily explicable as the former. The exanthemata are clearly heptal, or of seven days' course. Typhous fevers are calculated by weeks. Catarrh is of septenary duration. Exacerbations and relapses are both diurnal and septenary. Continued fevers undergo changes regularly repeated every 24 hours. Relapses of periodical fever generally take place on the 7th and 14th days. Hemorrhages recur often after a fortnight or a month. Even the most anomalous examples of recurrent paroxysmal diseases seem to follow this general law. In Kasan in Russia, and the government of Ufa, intermittents prevail in July and August, which attack the patient only on the 7th day, yet so violent that they often prove fatal. I have already alluded to a strange case reported by Trousseau and Bonnet of an English officer, who for twenty-five years had a return of headache on the Wednesday of every fourth week. Moore, also quoted above, cites three cases of febrile recurrence—one of a boy of seven years old, who "suffered monthly attacks of intermittent fever;" a second, "of Hong Kong fever, whose returns were at the full of the moon;" and a third "of Jungle fever from India, which resembled the last mentioned, as coming on also at full moon." Ruysch relates an instance of the recurrence of seven paroxysms of hemiplegia or congestive apoplexy, at intervals of one month.

I cannot help considering the periods of rhythm in disease, although I admit their frequent correspondence with the healthy movements, as chiefly derived from and dependent upon a special train of movement inherent in the nature of the disease, and constituting a part of its essential character. "Rhythm in disease," says Henle, "is only rhythm of normal vital processes;" but if this be true, whence the intermission in certain instances? Take, for example, the "sun pain" of Drake, the catarrhal inflammation of the frontal sinus and antrum—why should the pain subside and the purulent secretion and dripping from the nostril cease at twilight or nightfall to be renewed at the next sunrise? Or why thus renewed? With what normal action is this movement consonant? If hectic and quotidian be thus in conformity, what shall we say of a tertian? What of a quartan? And if I am answered as to these simpler types by a reference to any imaginable repetitions of normal movements, where shall we seek an explanation of the complicated varieties of the duplex and duplicate and triplicate tertian; each separate series of paroxysms seeming to keep up an unbroken connection, while suffering no involvement or confusion of period or characteristic symptom?

Every physician must become familiar with the regular recurrence of morbid phenomena of extremely varied form. I have before me an interesting history of a case of intermittent strabismus, in which the patient, for many months, was subject to squint on alternate days. This symptom was always attended, too, with obvious, though not urgent indisposition.

I saw, some years since, an officer of standing in the navy, who had been bitten by a centipede, the part injured undergoing some inflammation. Similar inflammation was renewed for years after, at regular intervals of six months. Examples like these might be multiplied, if our space permitted, to a very great extent.

It is true, that all recurrent diseases are not necessarily rhythmical or periodical in the proper sense; some return, simply because of the repeated, though transient reapplication of their specific causes. A distinction should, therefore, be made here. A subject living in a malarious country may renew his attack from year to year by undergoing the same or similar exposure. But there are numerous instances on record, in which, after removal from its source, the obstinate tormentor has persisted in its return after a regular interval. Neurotic and neuralgic affections are prone to take on this periodical character and assume this unconquerable tenacity. Epilepsy, from whatever passing impression, thus engrafts itself upon the constitution; and the same is true of many other nervous ailments as we call them.

Hemorrhages are sometimes very regularly recurrent; this is, perhaps, true of each of them occasionally, but has been most frequently remarked of hæmoptoe. It was a natural suggestion to account for the fact here, by reference to a supposed gradual and uniform accumulation of blood, manufactured in undue amount, giving rise to an augmenting pressure upon and distension of the vascular and other tissues, until the molimen became irresistible.

Thus, also, according to the fungous and animalcular theories of Malaria, we have an analogous explanation in the hypothesis that the reproduction, increase, and death of successive generations of the sporules, or living creatures, took place in regular and definite progression. Nor has there been any unwillingness to extend the same broad views over the general field of paroxysmal and recurrent maladies, whether neurotic or humoral. Willis, long since, refers to the development of some morbid matter which shall, from time to time, require to be eliminated, as the most satisfactory mode of accounting for the phenomena. The reflective and sagacious Holland, too, uses language very similar in its purport, when he says: "We can scarcely avoid the admission of some morbid matter generated in definite periods of time, the symptoms not coming on till the accumulation or maturation has reached a certain point, carrying away in their progress the active causes of disorder, whatever they may be, and thereby producing the interval that ensues." This is sufficiently ontological and in direct enough opposition to the modern pathological philosophy which shrinks so fastidiously from any acknowledgment of the essentiality of diseases, refusing, indeed, to regard them in any sense as entities.

These reasonings will apply well enough to the history of the exanthemata, and, perhaps, of fevers generally, which have from time immemorial been regarded by a certain school as the natural means of throwing off something oppressive and injurious to the system. But we have periodical affections, not only febrile, but of great diversity, inflammatory, and nervous. Here it is suggested that excitability or irritability has become accumulated, whence there happens a paroxysm which exhausts it, and gives an interval. This is a vague and obscure view of a point abundantly dark in itself, and often attempted to be illustrated by allusions to electrical analogies, as when we read of the enhanced "polarity" of the spinal cord, or any portion of the nervous tissue, which, rendered thus active, or, so to speak, overcharged with a surplus of some supposed force or fluid, discharges itself through and by means of some violent and disordered actions. Recently we find even Todd having recourse to this imaginative mode of inquiry, and proposing the opinion that the convulsions of epilepsy are owing to the accumulation of some morbid materials within the system, which at last attaining an excessive and unendurable amount, occasions and finds vent in the horrid explosion.

We gain nothing, I fear, by an indulgence in this class of intermediate conjectures; and in the present state of our science are fully justified in ascribing all the phenomena in their observed sequence and succession to the force of an ultimate law, which governs absolutely each separate class of instances in a characteristic and determinate manner. We can give no better explanation why the willow grows rapidly, and produces no fruit, while the fertile olive is of proverbially tardy arrival at maturity. Nor can we understand the immense difference in the vital duration or longevity of the several species and genera of animals—why a dog must die before he has attained a score of years, and man may attain his century and upwards. The fact depends upon the peculiarity of inherent constitution or mode of being, and is otherwise inexplicable.

The doctrine of crises and of critical days must not be omitted to be referred to in this place. It follows clearly enough from what we have said of the regular progression, acme and decline of diseases, at least of those which we term acute, that there must be, if we can detect it, a point of culmination, or, so to speak, full and complete maturity; this we may call the *crisis*. If in possession of a full understanding of each individual case, we may now give a correct prognosis as to the result. Either the force of morbid action, henceforth destined to decline and subside, has subdued the vital powers of the subject, and inflicted in its course some fatal injury, or it has failed to do this. We shall thus be led to call the crisis a favorable or unfavorable one.

It is, I think, equally clear that the existence of such crisis or point of culmination is only predicable of a continuous malady; intermission or remission, introducing a new and disturbing element, which shall render the discovery of this acme, difficult in itself, and indeed of little more than theoretical value, almost impossible. Remittents differ, also, greatly from intermittent affections here. The calculation of critical days has hardly ever been attempted in the latter class of diseases, whether febrile or non-febrile; while they are strongly contended for, as belonging to the history both of remittent and continued fevers. I am ready to admit that there is and must be, theoretically, a critical day in each individual case; and that this critical day or hour must arrive, in any given class of cases, at or about an average period in the course of the disease. In the artificial life that we live, and in the constant and almost inevitable interference with the processes of disease exerted by all our habits and customs, I think there will be found abundant causes of modifying influence upon the progress of these actions or changes which must render the discovery or prediction of this exact point a matter of great difficulty and incertitude. Perhaps we note it clearly in the exanthemata alone.

Nor do I see any reason in the nature of the case, or in fact, for the belief that there is more than one natural crisis in any case, or that there is or can be a succession of so-called "critical days." But this subject will be spoken of again in another relation.

It follows, also, from what has been maintained of the "vital duration" of diseases, that there must be a fixed period at which they terminate; and, indeed, many writers have maintained that the hour of death may be predicted in every separate order of maladies—acute diseases more especially—with reasonable certainty, or high probability. There are, however, many disturbing contingencies which interfere with this matter, and produce confusion and irregularity; and it will require the collection of a very large mass of statistical observations to enable us to attain any clear knowledge on this subject.

SECTION V.

TENDENCY OF DISEASE.

DURING the ancient reign of the humoral pathology, in its undefined, unlimited, and exaggerated form, all fevers, the exanthemata especially, were imagined to constitute mere efforts of nature for the expulsion of some morbific matter by eruption or transudation. The practice deduced from such notions was equally sound and reasonable. The patient was sweated with blankets in a close room, often heated with artificial fires, while the powers of nature, suspected of being insufficient for the attainment of her purposes, were supported by the administration of stimulating cordials and alexipharmics. Nay, even in the writings of a Cullen and a Rush, and in some of the lucubrations of the present day, we find fevers and the phlegmasiæ attributed to this supposed recuperative reaction after debility; as if any cause, in its own nature depressing or sedative, could carry with it an essential proclivity to an excitant operation, or, as if the human constitution were so disposed as to swing, like a pendulum, as far on one side of its correct centre as it had been previously drawn or pushed to the other.

The distinguished Professor of the Institutes of Medicine in the time-honored University of Edinburgh teaches that the increased flow of blood to an inflamed part, instead of being an injurious congestion, is a wise effort of nature for good purposes, and should rather be aided than interfered with, and that the chief portion of the series of changes in which inflammation itself consists, is not destructive but formative and reparative. (Vide *Bennett's Clin. Lect.*, p. 275.) "Suppuration, especially, should be looked upon as a kind of growth, and, instead of being prevented or checked, encouraged as much as possible."

The animal body is a combination of machinery so admirably constructed that, like an ingenious piece of common mechanism, it has a tendency to continue the movement or mode of action for which it was made, and which, when it began to live, it began to carry on. There are many circumstances, however, such as have been enumerated among the "causes of disease," which serve, when brought into contact with it, either to obstruct these regular and natural actions, or force it to fall into certain new and irregular movements—the multiplied forms of disease.

Happily for us, few of these causative agencies are permanent in their application or influence. The occasional excitement is removed or passes away, or the predisposition, the susceptibility to its effects, wears off, or is exhausted; the morbid impression, if not renewed, undergoes a gradual effacement by the ordinary processes of use, waste, and supply, and is ultimately obliterated, the system returning to its original condition of health, or approaching it more or less closely.

But we do not always witness this restoration of the natural actions upon the removal of disturbing contingencies. Many functions, if suspended for a time, are not likely to be resumed, even though the organs engaged in their performance have escaped all lesion.

Asphyxia continuing for a brief period, no matter how produced, is fatal; the heart refusing to resume its suspended systole and diastole. Respiration being checked for a time, whether by drowning or occlusion of the mouth and nostrils, or compression of the trachea, the subject will breathe no more. The impediment to the performance of any function always offers a risk proportioned to its protracted duration. Even a transient interruption to some of the more essential of the vital processes may be very promptly destructive by the peculiarity of the impressions sympathetically diffused. Thus, mere concussion of the brain, sometimes by a blow or a fall, or as in some apoplexies and certain cases of strong mental emotion, a mere modification of its vascular condition, without any perceptible lesion, shall determine immediate death. Thus, too, a blow upon the pit of the stomach kills instantly by an undefinable impression upon the great sympathetic, under which the whole system at once succumbs without a struggle. Prussic acid applied to certain surfaces, as the eye and the tip of the tongue, produces an extinction of life similarly quick—perhaps by a similarly indescribable impression, conveyed with lightning speed throughout the entire organism.

In disorders of structure, everything must depend upon the nature of the functions interfered with, whether immediately necessary to the preservation of life or not; whether the part is irritable or indolent; whether comparatively insulated, or closely bound up with other organs by intimate and extended nervous relations. If, for example, the thyroid gland becomes affected with bronchocele, little or no injury accrues to the general health, unless the goitre grows to so large a size as to interfere mechanically with respiration or deglutition, or with the cerebral circulation.

But when the heart is the seat of organic derangement, the whole body must suffer, on account of the universal dependence of every part upon a uniform and regulated circulation; while its indispensable but now ungoverned action, becomes self-irritating and self-exhausting. Thus it is also with the stomach and intestines, kidney and bladder, whose duties admit no interval, whose sympathies know no repose.

Morbid agents, the causes of disease, differ among themselves, not only by the tenacity or permanence of their impression, but by its specific or characteristic peculiarity in the production of given results. Scrofula is equally tenacious with carcinoma; but most of the structural alterations it gives rise to are compatible with the continuance of life; that is, they are only fatal by degree. Not so with cancer, which effects such alteration of the condition of the part it occupies, as must essentially destroy the body to which it belongs. Hence, we term it and the analogous affections, fungus hæmatodes, &c., malignant; and the appellation is deserved.

Even in the simplest inflammation, furuncle for example, the morbid action is apt to persist; pus is thrown out, forming an abscess, or diffusing itself among the tissues; finds its way by destructive and deforming ulceration to and through the integuments, or entering the vessels, poisons the circulating fluids and puts an end to life.

Under ordinary circumstances, a part takes on again its usual and healthy action, when the causes which disordered it are timely removed, with a readiness proportioned generally to its vascularity, because this is almost an exact measure of the force and fulness of its vitality, and of the rapidity with which it goes through the physiological alternations of waste and supply, or renovation; to which, and not to any new or separate principle—a distinct *vis medicatrix*—I ascribe unhesitatingly all processes of cure or restoration.

Disease is by no means, nor can we conceive of it as being, a natural condition of the animal body; nor is it the product of any spontaneous action of any organ or system of parts, or of any one of the vital forces, so called; neither can any separate natural provision be shown to be made for its removal or arrest, and most surely not, as has been imagined, by the very processes in which it consists. It is "a forced state," as Brown and Rush have pronounced life itself to be; not only occasioned by, but dependent upon the presence or influence of some special agent, interfering, in its own definite mode, with the regular play of the organization by which the functions are performed. This cause ceasing to act, the disease produced by it necessarily comes to an end, and the train of natural and healthy movement goes on again; but if the influence of the cause continues permanent, the disease will continue. Hence must ensue disorganization and death, in the part affected, if the disorder be merely local; if general—systemic, universal, or what Symonds calls "somatic" death must be the consequence.

DEATH.

Of death without disease, from natural decay, I have already observed that it is but the unavoidable result of the gradual impairment and extinction of the functions, occasioned by the progressive failure of action of the organs of supply. It may be referred to in this place, in the phrase of Blumenbach, as "the last and principal object of medical science to procure." The shortness of human life has been the subject of incessant lamentation and repining, yet without just cause; for if ultimate decay be a necessary consequence of the construction of the body and the constitution of its materials, death surely is to be considered rather as a relief from the evils of extreme old age. Indeed, when we look upon the dim eye, the tottering step, and the childish imbecility, both mental and physical, of the old man, it is a melancholy consolation to reflect that the outlets from life are so numerous, that we are likely to reach our certain goal, the grave, by some nearer and less lingering route, and thus escape the hopeless and helpless state of drivelling dotage.

Bichat describes death from old age as commencing with a loss of the power of locomotion; the circulation becomes feeble, the extremities no longer retain their vital warmth; the organs of the senses lose their faculties; respiration, slow and oppressed, grows more and more difficult, and finally terminates forever with a deep expiration.

Death from disease—pathological death—will of course present phenomena varying relatively to the causes which produce it. The topic is a vast one, and full of interesting detail; but I must abstain here from any minute discussion of it. It may be well, however, to remark that some of these causes operate apparently by merely impeding the proper play of the organs, which cease to act, finally becoming more and more weakened, and finally exhausted in the struggle. Fevers are usually fatal in this mode; by their congestions, preventing the performance of some necessary function; or by their inflammatory changes, unfitting the tissues for their duties. Lightning, on the other hand, prussic acid, and some of the contagions, seem to kill by positive extinction of the principle of vitality. Observe the difference in an animal pithed, as the phrase is, in whom the powers of life succumb instantly, and one decapitated, which continues to exhibit some of the phenomena of life for a period of indefinite extent. Notice a game-cock, gaffed in the occiput, which dies instanter, perhaps from lesion of the "vital spot" of Fleurens, and a fowl killed in the ordinary way, by cutting or twisting off the head, the bill opening and shutting, and the body leaping about for some minutes.

Much has been said of the mode in which life becomes extinct, and of the part which retains it longest; the right heart, the muscular system, the biceps especially, &c. In the *Gaz. Méd.* (Paris), June 28th, 1851, pp. 413, 414, we have an extract from a communication made at a sitting of the Société de Biologie, by M. Gosselin, in which he states that he has "proved the existence of the vibratile epithelium with movements of the cilia on the mucous tissue of the nasal fossæ, of the maxillary and frontal and spherhoidal sinuses." An executed criminal brought to l'Ecole Pratique, eight hours after death, afforded opportunity for some interesting observations. "At that time the ciliary movements were extremely marked on the mucous tissue of the nasal fossæ and of all the sinuses, as well as on that of the trachea. Thirty-two (32) hours after death, these movements were enfeebled, but very evident still, and most pronounced in the trachea; 52 hours after death, they had ceased in the former, but the vibration was still *tres prononcé et tres forte* in the trachea at its upper part." It was the 17th of May, and the parts exposed putrefied, but this movement continued until 62 hours after death. In another subject in June, M. G. saw these movements go on as long as 78 hours after death—as long, that is, "as the cellules kept their form and natural appearance," in the midst of encroaching putrefaction. MM. Robin and Richard reported having seen these ciliary movements in the trachea and in the uterine tubes, 24 and 30 hours after death.

Besides this obvious distinction of deaths, into what I would, for want of better phraseology, speak of as its positive and negative forms, writers have suggested numerous divisions, founded on the nature of the circumstances. Dr. J. H. Symonds, the author of the able article on this subject, in the *Cyclopedia of Anatomy and Physiology*, recognizes two modes of death—1, molecular; and 2, systemic or somatic. The first refers to the abolition of the vital actions—nutrition and contraction, which go on between the particles of which living bodies are composed; the second, of those which take place between the organs whose combination constitutes the entire system, respiration, circulation, innervation, etc. He proceeds to lay down and illustrate the following propositions: 1. That molecular death does not, unless universal, necessarily involve systemic death; 2. That when partial, as in mortification, the tendency of molecular to produce systemic death, depends on the importance of the part; 3. That when occurring in one part, it can only induce the same change in another part, by interfering with some of the systemic functions; 4. That systemic death must necessarily be followed by molecular death; and 5. That its reality can only be proved by the results pertaining to molecular death.

Williams, in his valuable *Treatise on the Principles of Pathology*, speaks of the chief varieties of the modes of death as follows:—

"Death (cessation of function), beginning at the heart,	Sudden, syncope; Gradual, asthenia.
Death, beginning at the breathing apparatus,	Asphyxia or apnœa.
Death, beginning at the brain,	Coma.
Death, beginning at the medulla,	Paralysis.
Death, beginning in the blood,	Necræmia."

In those who are conscious of its approach, death is very generally (though not always) preceded by a feeling of intolerable prostration and weakness, which some, in describing it to me, while dying, have referred to the heart or precordia; others, distinctly to the stomach, the epigastrium. Respiration becomes laborious, owing to want of energy in the nervous system, now deficiently stimulated by the feeble flow of blood from the heart, which acts more and more languidly; the blood is less arterial and vivifying, or rather becomes sedative by its augmenting venous quality; the sensorial influences are no longer transmitted from the brain and medulla spinalis—a full and heavy expiration is made, and the breathing ceases. The heart, of which the right ventricle contracts last, at length beats no more, and life is extinguished.

Yet these phenomena do not constitute death, although invariably attendant on it; for they are all to be observed in certain cases of suspended animation, when the subject is still capable of being resuscitated. For this reason, as I considered excitability to be the chief characteristic of life, if indeed it is not the very principle of vitality itself, under another name, so I would describe death to consist in the loss of the capacity of being excited by the application of stimuli.

The signs of death are, then, all of them, in some degree equivocal, though in the vast majority of instances, the coincidence of the greater number of them would leave no reasonable doubt in the mind of the inquirer. The peculiar paleness and ghastliness of the face, and of the surface generally—the flaccidity of the cornea of the eye, and the icy coldness of the skin even of the trunk, would appear to be sufficiently distinctive; yet they are affirmed to have been occasionally concurrent in instances of merely suspended animation. Rigidity, which Louis and Symonds affirm to be independent of the cooling of the cadaver, is regarded by the majority of writers as a certain token of death. But Bichat doubts it, and I confess myself unwilling to trust to it. Others dwell upon the green discoloration of portions of the surface. Before proceeding to interment, I would always wait for the commencement of decomposition, as evinced by its own peculiar odor. This is the only certain sign of death; the mere thought of burying alive a human being, is too horrible to allow us to run the least risk of such an accident; and there are, unfortunately, too many instances on record of this mistake, to permit us for a moment to regard the danger as imaginary.

PART II.

SPECIAL PATHOLOGY

AND

THERAPEUTICS.

CLASSIFICATION OF DISEASES.

It is neither consistent with my inclination, nor with the pressure of time, which must be devoted to objects more worthy our attention, to enter here into a detailed discussion concerning the arrangement or classification of diseases. A few observations are, however, necessary to explain the plan which we are to follow in treating, successively, of the several subjects about to come under our notice.

It has been warmly disputed, whether any advantages are to be derived from the various efforts made at different times to divide and distinguish the innumerable and diversified forms of disease into classes, orders, genera and species. I cannot, I will confess, set any very high value upon these endeavors at minute and particular arrangement, and we have, I think, fair and satisfactory proof of the failure of them all hitherto, in the continued multiplication of adventures on the same field. But, although no perfect system of nosology has yet been suggested, as indeed perfection in classifying is not to be expected until our knowledge of the materials to be classed is complete, yet it would be unreasonable to overlook the learned labors of the long series of nosological writers who from Plater down to Wetherhead, have been so assiduously engaged in minute researches into the history and affinities and characteristic phenomena of the widely distributed tribes of human maladies.

Each of these inquirers found it easy to detect deficiencies and errors in all the plans of all his predecessors. To avoid similar faults on his own part, it behooved him to institute a closer and more precise investigation into the nature of each individual disease, its relations to others, their resemblances and their dissimilarities. In this way, the intimate knowledge of morbid phenomena was of necessity extended and improved, and daily additions are making to the stocks of facts thus accumulated.

For the benefit of the learner in all the sciences, some arrangement has been found indispensable to prevent confusion, and facilitate the attaining a clear and comprehensive view of the field which he has entered upon and is about to explore; and in this regard, the most inaccurate of systems may be of use to him.

Of the two modes or bases of nosology offered for our choice, one is deduced from a study of the discrepancies—the opposed or contrasted circumstances, which go to form essential parts of the history of individual maladies; the second dwells upon the resemblances—the points

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of unison, similarity and connection, which may exist between them; the symptoms or conditions which they may present in common, each with the other.

I am disposed to select the latter in preference for our guidance, simply because the diversities of circumstance which may be detected in the investigation of diseases, are absolutely interminable and infinite; and it would be exceeding difficult, if not totally impossible, to draw the line between such diversities as ought to be considered important and characteristic, and such as should be looked upon as trivial and merely incidental.

That method of classification will evidently be most useful which is most obvious, simple, and natural; it will be more likely to be permanent in proportion as it is unconnected with any particular theory or tissue of doctrines. It should depend on and refer to some bond of connection always present and readily observable, such as, 1. Identity of cause; 2. Similarity of phenomena; 3. Community of location or seat.

1. The etiological method, formerly popular and employed by Boerhaave and Hoffman, is now altogether abandoned, and, as it seems to me, of necessity; for, as I have already had occasion to remark, the constitutional predispositions determine the form of the morbid affections induced by a large class of exciting causes; and these are not only obscure in their nature, but are undergoing incessant changes relatively to the various conditions of the individual assailed; they are, therefore, transient and uncertain.

2. The symptomatology of disease has afforded the foundation, however, for almost all the more recent efforts of the nosologists. Upon the distinctive symptoms are drawn up the tables of Sauvages, Cullen, Parr, Hosack, etc., in all which, it is easy to indicate numerous errors and deficiencies; but the task, though not difficult, would be ungrateful and attended with no particular benefit.

3. Cullen, the most justly celebrated of these nosological writers, in the constitution of his plan and arrangement, was led to denominate one of his classes quite incongruously, by an appellation not referring to any regular series of symptoms, but derived from the supposed affection of a particular order of parts—a separate set of organs. I allude, as will be at once perceived, to his class *neuroses*, in which he, and those who follow him, have comprised the disorders generally which derange or disturb the *nervous system.* Enlarging and extending this suggestion, Dr. J. M. Good proceeded to arrange all diseases in the same way—that is, by referring them to the *systems* or orders of parts in which they hold their seat or make their primary appearance; and advocated its propriety in a very full and ingenious treatise on the subject, prefatory, as it were, to his learned work entitled *The Study of Medicine.*

Professor Chapman, the estimable and highly venerated teacher of practice in the University of Pennsylvania, was always governed by the same physiological method in his lectures, whether adopted anterior to the publication of Good's nosology, I am not positively certain.

Good himself, however, fails in a consistent and proper adherence to the plan with which he sets out, and confuses himself by an occasional and indefinite reference to the distinctive symptoms rather than the seats of diseases—as in setting apart inflammations as an order (phlogotica), under his third class hæmatica, and in placing cachexies, also, as another order under the same class.

Indeed, in one of the paragraphs of his preliminary dissertation, he admits the preference to be due to these distinctive signs. But granting what he is, at least, partially willing to concede, that "the symptoms of a disease constitute the disease itself," a proposition much insisted on by Rush, and admissible enough in a practical point of view, though incorrect if considered abstractly, it by no means follows that we are to make these bundles of symptoms our bases of arrangement. We should thus, as all experience goes to prove, involve ourselves in confusion inextricable; for many of these phenomena are common to an infinite number of maladies, and we shall never be able to decide which of them are characteristic, and which unessential.

To cut this Gordian knot, which I would acknowledge it impossible to untie, I resort unhesitatingly to what is called the method of physiological nosology, distinguishing the tribes of disease according to the *seats which they occupy*—according to the *orders of parts* which they primarily and prominently affect—according to *the functions* which they disturb or impede.

This, although by no means faultless, seems to me so far preferable to all other known modes of classification, that I shall adopt it exclusively as the basis of the arrangement to be observed in this work, and shall go on to consider and treat of diseases in the following succession, as they prominently affect—

I. The Circulatory or Vascular System; including the organs of secretion and absorption, as well as of sanguineous distribution and nutrition.
II. The Digestive System; including the collatitious viscera, as well as those engaged directly in the solution and conversion of food.
III. The Respiratory System; in which, with Good, I merge the Vocal; because not separable practically.
IV. The Sensorial System; which coincides very nearly with the Neuroses of Cullen, Parr, and others.
V. The Motory System; including the whole mechanism of locomotion, as well passive as active: muscles, bones, joints, &c.
VI. The Excretory System; under this head are discussed the affections of the cutaneous integuments, and the diseases of the urinary organs.
VII. The Generative System: the topics comprised herein are divided properly between the departments of surgery and obstetrics. I shall not therefore refer to them except incidentally.

It is not enough that the practitioner should merely classify or arrange correctly the maladies which may come under his observation. *Special pathology* further implies the absolute individualization of each separate instance of disease; for it is impossible that any two examples should be exactly alike, or any two patients in precisely the same morbid condition. The *indications of treatment*, as our technical phrase is, can never, therefore, be altogether the same; some modification, specially appropriate to each, must and will be of necessity demanded.

Therapeutics comprise the whole management of an attack of disease; the regimen, the physical and moral control, nursing, &c., as well as the administration of medicines. Indeed, this general and comprehensive superintendence is often of far more importance than the mere pharmaceutical appliances and means employed. Voltaire's sarcastic definition of the "practice of physic" as "the art of pouring drugs, of which we know little, into a body of which we know less," is a most unjust reproach when applied to the modern scientific physician, of whom prudence is the peculiar attribute—*nullum numen abest, si sit prudentia*—and who believes with Chomel, and acts upon the belief, that "the first duty of the practitioner is to take care that he does his patient no injury in his efforts to benefit him."

"In teaching the Practice of Physic," says Cullen, in his admirable *First Lines*, "we endeavor to give instruction for discerning, distinguishing, preventing, and curing diseases, as they occur in particular persons."

We discern or know the existence of disease by the observation of its symptoms or phenomena. These I have detailed at some length.

We can only hope to prevent its access by the avoidance or removal of its causes, whether predisposing or exciting. This department of hygiene has occupied us to as full an extent as time and space have permitted.

SECTION I.

DISEASES OF THE CIRCULATORY SYSTEM.

It remains for me to point out how and by what characteristics diseases are to be distinguished, each from every other, and to treat of the application of the remedial means proper for the cure of each.

In the performance of this portion of my task, I shall place first upon the long catalogue before us, the maladies which are seated in the organs, and affect directly the function of *circulation*. These are, indeed, in every sense, topics of paramount importance, demanding our earliest and principal attention. The great number and variety of this class of diseases; the frequency of their occurrence; the interest attached to many of them on account of their violence and rapidity; and the fact of their being sympathetically induced upon and associated with so large a share of the disorders of other systems, all entitle them to the prominent place thus assigned them. The most obvious of these diseases of the circulatory system are those which affect the heart itself, the central organ of the system—carditis, palpitation, syncope, angina; and such as exhibit themselves in the minute or extreme vessels; of which latter, inflammation is the principal development, perhaps, though we must rank with it, as located in the same tissue, certain hypertrophies of morbid character, and most forms of disorganization and deterioration of structure—hemorrhages, dropsies, and congestions. On account of the very frequent connection of inflammation with almost every varied mode of morbid action in the animal body, whatever seat they may affect, and to whatever structure they may be attached, it has been thought proper to institute a preliminary discussion of its history, causes, symptoms, and consequences. With all these details, modern writers have inextricably interwoven the general subject of irritation, which it was deemed necessary, therefore, to investigate at the same time.

From these, the transition is easy and natural to the great topic of Fever, demanding our immediate consideration, as comprising so many of the diversified phenomena of irritation, inflammation and congestion —of all forms of vascular and sensorial derangement. The combination of symptoms which we are accustomed to comprehend under the name of fever, intrude themselves upon us either essentially or incidentally, during the progress of almost every malady enumerated by nosologists; in a majority of which, indeed, their presence is characteristic—or at least essential and inevitable.

Hence it is the especial duty of every student of medicine at the very threshold of his professional career, to devote his most earnest and profound attention to the investigation of these preliminary and elementary matters, without a proper understanding of which, indeed, his farther progress will be extremely painful and uncertain.

OF FEVER.

Fever is almost universally regarded as the widest outlet of human life, and has hence been for ages an engrossing theme with the ablest medical philosophers. We must confess with sorrow, what it would be presumption to deny, that this diligent and persevering inquiry has been attended with a degree of success far from flattering, and that we are still, in reference to the whole subject, involved in lamentable ignorance and uncertainty. To detect clearly the intimate nature of fever; to discover the essential mode or modes of morbid action in which it consists; to throw light upon these points, so long wrapt in impenetrable obscurity—"*atra caligine mersa*"—would indeed form an era in our art; would constitute emphatically a revelation in medicine.

Few writers have hesitated to acknowledge the vagueness of the views entertained concerning some of the observed phenomena, and the difficulty of defining what was so imperfectly understood; a large proportion of them have nevertheless ventured to propose, each in his turn, a doctrine or "theory of fever," as the phrase is, which should expel, and serve as a substitute for those of his predecessors. It would not be difficult to show the insufficiency and inexactness of every one upon this lengthened and still accumulating catalogue, but the task is both ungracious and unprofitable.

To describe, however, is far easier than to define; and many physicians, both ancient and modern, have drawn and transmitted down to us, pictures or portraits of the several types of fever, which deserve, for their graphic vividness and their exact correctness, the most unqualified praise.

The incipient changes, the primary modifications of action in fever, have not been detected, or pointed out, but there is no want of hypothesis on the subject. The solidists, generally, assume that they are of the nature of irritation or of inflammation, excited in the first instance by some agent capable of impressing an irregular or morbid influence directly, or secondarily by reaction supervening upon a transient state of debility or prostration. A few have regarded these impressions as determining rather congestion than inflammation.

The humoralists maintain, on the other hand, that the earliest tokens of febrile disorder are to be found in the altered condition of the vital fluid, to whose deleterious qualities they consistently attribute many or most of the phenomena subsequently developed in the progress of the attack.

Almost all pathologists admit and dwell upon a concurrent disturbance of the sensorial and vascular systems, as essential and characteristic in the history of fever.

The phenomena of fever prove indeed distinctly enough the co-existence of these prominent conditions. "The great difficulty in the pathology of fever consists," says Gregory, "in showing in what manner these disturbances of function are connected with each other." Feeling this difficulty, in common with my predecessors, I have simply expressed or stated the observed fact, without any attempt at explaining or accounting for it. This, I acknowledged to be entirely out of my power—nay, there has not yet been offered a reasonable conjecture as to the relation which these two conditions hold to each other; whether they are linked together as cause and effect, and if so, which of them deserves to be considered the source of the other; or whether they are not rather the coincident results, merely, of the impression of some common morbid agent. The presence of these two elements in contrasted degrees of prominence might serve indeed as a basis for the division of fevers into two great orders—the neurotic and the hæmatic: the first irritative and congestive; the second malignant, hemorrhagic, humoral, putrid.

It is usual to speak of the derangement of the sensorial system as a state of "diminished energy," and of the vascular disorder as implying of course "increased excitement and more forcible action." I will not affect any very special nicety of discrimination in a matter so obscure, but suggest that the symptoms of disturbance of the functions of these important systems are of complex or combined character, and exhibit in both of them each of the above conditions—proving that with some loss of actual energy or power, the excitement in both is increased, and the action has become irritated and forcible beyond a due proportion to the capacity for action in the organs concerned. Hence the debility so soon induced, and hence the irregular determination to structures or surfaces predisposed to derangement and disease.

Further, although such phrases may suffice to refer to many of the phenomena, I cannot satisfy myself in regarding the true pathology of any disease as a mere question of less or more—plus or minus. Not only is there evidence of irregularly defective innervation in some parts of the system, and morbidly intense sensorial action elsewhere, but the mental operations and the sensitive perceptions are usually deranged in a notable manner, as shown by delirium, and by depraved states of the organs of sense. Not only do we meet with local hyperæmia, active and passive congestions and inflammations, but we find the blood morbid in its qualities, and all the secretions vitiated.

The true question is as to the precedence and succession of these changes. The solidists affirm that the organs are disordered in the performance of their functions merely by undue determination, and excitement deficient or excessive; the humoralists that the fluids are changed in condition previously to any perceptible changes in the modes of organic action. Thus Potter tells us that in experimenting on the subject, he found the blood altered in appearance during the prevalence of yellow fever, in persons who as yet retained seemingly their usual health; these changes in the blood being, occasionally at least, the precursors of an attack.

I shall not hesitate to retain the long established distinction of fevers into *symptomatic* and *idiopathic*. My senses and my reason both recognize an obvious difference between the febrile disorder consequent upon, and produced by, a wound of soft parts, dislocation of a joint, or fracture of a bone, and that which, however apparently analogous, arises without the occurrence or manifestation of any notable accident, or evident change previously affecting the body, or any of its parts; and there seems to me little risk of confounding exanthematous fever and that which is connected with inflammation of the pleura, or of the brain, with any of the numerous types attributed to malaria, and offering at their invasion no constant injury of a special organ, but rather dividing (as in the faithful sketch so often quoted from Fordyce) its disturbing influence over the whole constitution. Notwithstanding these points of separation and contrast, however, which seem to afford safe and broad ground for a rational diagnosis, the weight of modern authority is decidedly in favor of considering all fevers as symptomatic—the extension of general irritation and disorder from some local affection. There is much dispute, however, as to the point of local origin. Clutterbuck fixes it in the head, and regards fever as nothing more than the secondary or constitutional result of inflammation of the brain and its membranes. Broussais attributes it to an inflammatory irritation of the mucous tissue of the digestive tube, and especially the stomach. With vastly more plausibility, others have rejected these exclusive theories, and considered all irritated and inflamed organs as centres from which may radiate the different modifications of fever. Thus, Professor Marcus finds in the brain the original irritation upon which typhus is generated; in the lungs, that of hectic; in the trachea, that of catarrhal fever, &c.

I am not disposed to pursue this discussion, and shall, therefore, hazard but one remark further on this point so warmly disputed. It is highly probable that no cause of disease possesses such indefinite extent of impression, as to act at once upon more than a single part; and besides, it is consistent with all analogy to suppose that every cause of disease is determined to, and fitted to act specifically, or, at any rate, specially upon one organ or tissue. It follows, therefore, or it is highly probable, that all disease is, to speak with logical precision, local in its origin.

But, on the other hand, the observed facts do not bear us out in the dogmatical assumptions that I have above alluded to. We do not know that the cause of fever exclusively affects the solids in the first instance. Admitting the solids to be primarily affected, we do not know upon which of them the earliest impression is made—whether upon the surfaces, or within the substance of organs—the cerebral mass, or the mucous membrane. We do not know the nature of the primary impression, whether it be sedative or stimulating. We do not even know the character of the first link in the chain of notable acts, whether it be irritation, in any one of its vague senses, spasm, inflammation, or congestion. Nay, to conclude this summary confession of our ignorance, we know not whether either of these is essential to the existence of fever, or whether they may not each, or all of them, occur separately or coincidently. We meet with them all in the progress of the various types of fever; yet not promiscuously, but in connected trains, seemingly allied to, and dependent upon each other. I repeat, then, my accordance in the ancient belief of the existence of a class of fevers properly contradistinguished as idiopathic. The original irritations, or primary local affections so much talked of, whatever be their nature, are often extremely obscure; nay, they may escape our notice entirely. It frequently happens that they do not present themselves, or attract our attention until so late a stage of the case, that it is much more reasonable to look upon them as consequences than as causes of fever.

It would answer no very valuable purpose to go minutely into an investigation of the merits of the theories of fever, which have, from time to time, flourished and sunk into oblivion. In the majority of those which have been most extensively received, there has been a singular concurrence in the assumption of debility as an essential precursor or characteristic symptom, or a necessary portion of the history of the disease. Brown makes debility its very elementary essence. Cullen builds the whole of his fanciful doctrine of fever upon this idea. Debility is the cause of the cold stage, which brings on the hot stage, which, in its turn, produces the sweating stage. His first link in the chain is an atony and spasm of the extreme vessels, and the phenomena of fever are the consequences of the efforts of nature to remove this state of things. Rush regards debility as an indispensable prerequisite; the disease consisting, according to his views, in the reaction which results *ex necessitate* from this state of depression. He does not allow reaction to be owing to any such cause as the supposed energy of a *vis medicatrix naturæ*, but affirms it to be necessary and mechanical. Darwin very plausibly makes this reaction or excitement following the debility the effect of stimuli upon accumulated excitability; a most ingenious but unsatisfactory idea. It serves to explain the phenomena of intermittents only, and cannot be applied to remittents and continued fever, more especially in long protracted cases of the last mentioned type. To a precisely similar objection, the thermo-electrical hypothesis of Folchi is liable, and it is here equally fatal. This author supposes a fluid to be evolved by the natural and healthy actions of the sensorial system, which is, as the title imports, calorific as well as physiologically excitant, diffusing warmth and vitality throughout the body. When it is, under any contingency, carried off too rapidly, then follow chill and prostration; then comes reproduction of the thermo-electric fluid, accumulation, reaction, with accelerated circulation and respiration, constituting fever.

Some of the causes of fever are notably and beyond doubt of an exciting or stimulant character. These occasionally act with prompt efficiency, and give direct origin to unequivocal symptoms. Exposure to the heat of the sun, violent muscular exercise, undue mental exertion, and various modes of excess, bring on immediate attacks of fever.

It is also true, on the other hand, in numerous instances, that an interval of greater or less duration elapses after the application of a cause, and a latent period passes by, marked by no morbid development, no change in the usual health of the individual affected. It is true, farther, that the intensity of a stimulant cause may sometimes so exhaust the subject as to bring on a preliminary state of depression or prostration; but, after all, it is probable that a large class of fevers derive their origin from causes of a sedative nature, among which

I should be much disposed to rank both malaria and contagions. Famine and confinement in vitiated air are, beyond question, to be arranged under this head.

It is universally assumed, and seems altogether reasonable to believe, that, under all circumstances whether of direct or indirect debility, diseases of every kind, and fevers among the rest, find easiest access and admission into the system. But fevers do (and not unfrequently) make their invasion without being preceded by any notable symptoms of debility. Yellow fever selects for the object of its attack the most robust and athletic Europeans and northern men, whom it assails suddenly and without premonition; and the latent period of our malarial remittents is often a period of undiminished enjoyment of the usual health and strength.

Nor do I perceive any relation to exist between the cold stage of an intermittent, and any imaginable degree of preceding debility. If the latter were the cause of the former, they should correspond in degree, and concur with some uniformity. The chill or ague should be most vehement when the cause producing the attack was most intense in its violence, and the invading disease endued with the greatest malignity. Such is by no means the fact. "A chilly fit," says Rush, "seldom occurs in the most malignant cases of fever." Yellow fever often assails, unpreceded by any cold stage, or even any observable chilliness; headache and other pains, hot, dry skin, flushed face, etc., being our first intimations of the onset of the terrible malady. In the least dangerous cases of chronic quartan ague, on the other hand, the chill is violent, protracted and annoying.

It is a phenomenon ill understood and obscure; but I would prefer to regard it as chiefly and primarily affecting the nervous system, and as the result of some morbid impression upon that system peculiar to its nature. This obscure peculiarity is strongly manifested by the striking differences which we note in reference to the cold stage among intermittents themselves, as well as the contrast presented between them and the other forms of fever, remittent and continued, ordinary and malignant.

In ascribing the long protracted vascular excitement of a continued fever, or the intense violence of a malignant intermittent, to the preceding state of debility or defective action in the system as their source, however transient it may have been in duration, or apparently slight in degree, a most illogical error is committed. No careful reasoner will ever yield the necessity of exact relevancy and definite proportion between cause and effect. The so-called reaction is admitted to be very often, if not in a majority of instances, altogether disproportioned to the preceding debility; the latter, therefore, cannot be the cause of the former.

The *latent period* of fever, the time which elapses between the application of a morbid cause, and the commencement or manifestation of the train of effects to which it gives rise, deserves our attention in this place. It is most interesting to inquire what is the state or condition of the system during this period. Is the subject, over whom the sword of Damocles is thus suspended by a hair, is he to be regarded, shall he consider and conduct himself as if in the enjoyment of health! During the germination of the seeds of evil sown in the body, what obscure changes of a preparatory kind occur; or are any such changes essential? This is by no means a merely speculative disquisition. If we can ascertain the nature and modes of operation of the hidden influences that are at work, we may, perhaps, arrest the mischief, and efface or correct the morbid impressions, before time and habit have confirmed them. It has been thought that some analogy exists between this latent period or period of incubation, and the intervals of intermittent or recurrent maladies. During such intervals, we acknowledge the system to be in a peculiar condition, far and characteristically removed from that of true health, and institute a course of conduct based upon this view of the matter. We speak of patients, in these circumstances, as laboring under a strong and tenacious, it may be an irresistible predisposition, which no one will deny to be actual disease in a very definite sense of the word. In certain cases, we have discovered remedies closely, nay, almost specifically applicable to this state, as cinchona to the cure of intermittent.

This period is known to be under the influence of the ordinary revolutions which give periodicity to disease in general. It seems to exhibit some relation both to the capacity for resistance in the constitution, and to the force or intensity of the effective cause. It is doubtless liable to be greatly modified by circumstances. In some instances it is exceedingly brief. An example is given by Alison, of a physician being seized with typhus fever immediately upon exposure at the bedside. I knew an individual arriving from our healthy upper country attacked with dengue on the third day, in the summer of 1828, when it prevailed in the city. Sometimes, on the other hand, the period is protracted, and the assault of the impending malady postponed almost indefinitely. Some of the sufferers from the fatal and disgraceful Walcheren expedition (so notorious both in the military history and the medical annals of Great Britain) were attacked as late, we are told, as six months subsequently to their escape from that land of marshes and malaria. Dr. Halpin gives the result of exposure of 14 Irishmen in the fens of Lincolnshire, of whom 7 were attacked six months after their return home, and one not till about a year had elapsed. The apparent influence upon it of the septenary revolution, is familiarly noticed in our climate, where the opportunities for observation are unfortunately distinct and frequent. Malarial fever is expected to invade on or about the seventh or fourteenth day, and if the twenty-first passes without an attack, most persons consider themselves entirely safe.

Many endeavors have been made to ascertain and fix the latent period of the febrile contagions; but nothing is yet known very definitely on the subject, except with respect to two which admit of inoculation with fluid matter. We anticipate with confidence the occurrence, at fixed dates, of certain effects, both local and constitutional, from the insertion of the virus of vaccine and variola under the cuticle. But if we inoculate with the saliva of a hydrophobic animal, the germinating or latent period is altogether uncertain.

Cullen's definition of fever is admitted to be among the best that have been offered; and his successors have found it a far easier task to point out its defects than to present us with a preferable substitute.

"Pyrexiæ, or fevers," he tells us, "are distinguished by the following appearances: Beginning with some degree of cold shivering, they show an increase of heat and of the frequency of the pulse, with the interruption and disorder of several of the functions, and diminution of strength, particularly in the limbs."

It is scarcely necessary to remark that fevers often come on without any cold stage—without either shivering or chilliness. In some of the more malignant types, the skin does not acquire any additional heat, but falls permanently below the natural standard in that respect. Cases of this sort are known and dreaded in our own country, where they are spoken of as congestive, in contradistinction to the ordinary inflammatory attacks. The pulse is occasionally met with of less than the average frequency. Dr. Musgrave tells us that he saw it in a yellow fever patient, in Antigua, beating not more than 44 in the minute.

Interruption and derangement of the functions is unquestionably attendant on fever uniformly; but the phrase is vague and inexplicit, as failing to point out what functional disturbance is essential or characteristic; and it is well known that fevers differ among themselves, as to the particular organs, and of course functions affected. Nutrition is interrupted in fevers; secretion, whether from glands or surfaces, impaired and vitiated. Hence we have thirst, nausea, furred tongue, dryness of skin, or a clammy and offensive perspiration; high-colored and scanty urine, and constipation of the bowels, or diarrhœa, with acrid discharges. The diminution of strength is also, though a very general symptom of fever, liable to exceptions. I have seen it continue, in some of our worst cases of yellow fever, apparently unimpaired, until the near approach of death; and what is more to the purpose, it is matter of common remark that, under many circumstances, the muscular strength of a patient is to a certain degree restored by the access of a paroxysm of fever.

To offer a plausible rationale of the phenomena of fever, successively and in detail, would be a very difficult task, consuming much time, and requiring much nicety of research and ingenuity of reasoning; and after all, must be, in our present state of knowledge of minute physiology and pathology, in a considerable degree conjectural. For example, until we attain a more perfect comprehension of the mode in which animal heat is generated, we cannot explain satisfactorily the variations of temperature in the several stages and states of fever. At present, it must suffice to refer them vaguely to the disordered condition of the nervous system. We account with similar indirectness for the depraved condition and partial suppression of the secretions and excretions. The increased velocity of the circulation, while the voluntary muscles act languidly, we ascribe to the irregular distribution of excitement, which is said here to be determined inordinately to the vascular system.

Among the chief points which have engaged the writers on fever, is the doctrine of its natural tendency to run a certain course, and to terminate "in the restoration of health." By those who advocate this doctrine, it has farther been made a question whether we can arrest a fever in its course; nay, it has been doubted by many whether, even allowing this to be possible, it is safe or proper to attempt it.

The ancient notion that a febrile paroxysm was a salutary effort of nature to free herself from some oppressive load, or morbific matter intruded by some means upon the embarrassed organism, suggested these doubts, and led numerous and otherwise sagacious physicians to do little or nothing to support and aid the system in so trying a conflict.

But I cannot consider it safe or wise to trust to the capacity for resistance in a constitution already disordered and disarranged. The office of the physician is to remove, if possible, the source of evil; to counteract its influences, and to diminish their intensity by every means in his power; to subdue the predisposing excitability upon which it is fitted to act and has acted; to change by revulsive interference the determination of its agency, and save a vital organ or a delicate portion of the animal structure, by derivation to a stronger or a less important part.

I will scarcely stop to discuss the question of our power "to cut short the course of a fever." What physician has not repeatedly seen a febrile attack abruptly arrested, and all its concomitant irritations, congestions, and inflammations suddenly resolved by bloodletting, by emetics, by cathartics, by sudorifics, by quinine, opium, piperine? Who has not witnessed the distinct and decided substitution of mercurial action for the previous train of febrile symptoms?

The principle of periodical revolution regulates notably the movements and actions of the healthy organism, and does not lose its directing force in disease. Many of the phenomena of fever seem to be specially under its control. This is exhibited most obviously in the course of intermittents of various type, and but little less so in the periods of abatement and exacerbation in remittents.

Upon an attentive observation and nice calculation of these periods, is founded also the ancient doctrine of critical days in fevers of more continued character; that is, the supposition that febrile disorders are by their own nature disposed to terminate, whether favorably or unfavorably, rather at certain periods than at others, and that these periods are susceptible of being clearly known and designated. By the term *crisis* is meant a sudden, considerable, and spontaneous change, whether favorable or unfavorable, occurring in the course of a fever, and exerting a remarkable and decided influence on its character, progress, and ultimate result.

That such sudden and decisive changes do actually take place in the course of continued fevers, will not be denied by any observing practitioner; the true question is, whether they take place regularly and at calculable periods? The weight of authority on this matter is pretty equally divided, as well among the modern as the ancient physicians. The doctrine has descended to us from Hippocrates, and seems to have been originally founded upon the Pythagorean system of the power of numbers, supposed to extend through universal nature; the application of which was easy and obvious to times and periods of disease. The odd days, counting from the date of the invasion, constituted a large majority of the so-called critical days. Hippocrates, however, appears to have regarded every day in the first week as evincing a disposition to serious change; in the second week, every alternate day; and in the third, every third day. Many of his commentators affirm that he adds to all these the twenty-first day; but Cullen denies the propriety of this reading, and attributes it to error or interpolation in some of the early manuscripts. With this correction, the illustrious Scotchman receives the doctrine and advocates it warmly, adding the weight of his venerable name to that of the Coan sage, the time-honored father of medicine. In more recent times still, Robert Jackson, a writer of the highest respectability, whose treatise on fever is still worthy of particular study, has taken especial pains to make out with distinctness what days are critical, and has labored strenuously to establish their paramount influence. He is at variance with Cullen as to the alleged change from a ternary to a quaternary period in the third week or after the eleventh day, and maintains that crises also occur on the 13th and 15th. Now, if we sum up the critical days, as recorded in the several essays of the ancient and modern champions of the doctrine, Hippocrates, Galen, Cullen, and Jackson, we find them to include 13 in the first 21; viz: the 3d, 4th, 5th, 6th, 7th, 9th, 11th, 13th, 14th, 15th, 17th, 20th, and 21st, leaving but six non-critical, for we cannot properly include the first two. We cannot surely wonder, then, that in the natural course of things, a large majority of the crises should, as they assert, occur in the more than double number of days selected. It is unnecessary to go into any argumentative discussion upon this subject; indeed, the supporters of the doctrine claim the privilege of having it tested, not by reasoning, but by experience merely and observation.

Many, both of the earlier and more recent times, have totally failed in detecting or calculating these periods. Asclepiades and Celsus, two of the most venerable among the ancients, treated the notion with contempt; Jackson, whom I have already mentioned as its most earnest and vigorous advocate in more recent times, while he urges the necessity of attention to the subject, and remarks sharply that "ignorance in this respect is the source of perpetual mistake and disappointment," acknowledges, nevertheless, that "the subject is difficult and obscure," and that "there is no decisive evidence, on either side of the question," going on to speak of the occurrence of cases of fever, "in which the patient might be said to wade through the disease," the changes being so slight at the points of time specified, that even his practised discernment could not mark them. Gregory, though disposed to admit the doctrine on the authority of the great names enlisted in its favor, allows that "these observations can seldom be verified in the fevers of Great Britain." To the mass of negative testimony on the subject I must add my own, having failed entirely to satisfy myself of the influence of critical days in the fevers of our climate.

The distinction into separate types I shall hereafter discuss in some detail. A knowledge of these, sometimes confused and rendered to a certain degree obscure by the disturbing agency of the efficient morbid cause, is in the most indispensable manner necessary to the practitioner. Pathologists, fond of investigating obscure and difficult questions in medical philosophy, have taken profound interest in the inquiry, so fruitless hitherto, as to the cause of such periodical revolutions. Not a few have been disposed to attribute them altogether, whether as exhibited in varied types, or in calculable periods of crisis, to the direct influence of the heavenly luminaries. Balfour has written most especially of this matter in reference to fevers. He sets forth, in strong language, the sol-lunar influence upon all paroxysmal diseases; that is, the influence of the sun and moon, when in conjunction; and endeavors, with not a little ingenuity of argument, and some plausibility of fact, to sustain the positive affirmation that "exacerbations of fever may be expected to take place, and do indeed occur at the time of spring-tides (conjunction), and crises at neap-tides."

On such points as these, it may be permitted to be sceptical, and although prepared to receive all as truth, which is supported by proper and sufficient evidence, yet it is our duty to guard ourselves against the evils of credulity and error, by a patient, conscientious, and rigid examination of testimony.

The remote causes of fever will be more properly treated of in relation to the several forms which they seem adapted to excite. Many of these causes, I have said, appear to be of stimulant character, giving rise at once to irritation and inflammation. Others are undoubtedly of an opposite quality; remarkable instances of which will be found in the famine fever of Ireland, a malignant typhus, infecting whole districts in a state of starvation, and the analogous pestilence arising in jails, hospitals, and the crowded, ill-ventilated hovels of the poor, everywhere.

Concerning a large proportion of the obscure febrific agents, such as malaria and contagion, it is generally believed that they are properly depressing or sedative—but of this it is difficult to advance positive proof. We know as little of the modes of action of these morbific influences, as we do of their immediate and primary effects, or of the intimate nature of incipient febrile disorder. Some of them act probably upon and through the skin, as malaria, and perhaps, one or two of the contagions. This we infer from the less liability of the darker colored races of men, and especially of negroes to some of them, and from the protection afforded by wearing garments of woollen cloth. Dealers in oil are said in eastern countries to escape the plague. Hence was derived, perhaps, the ancient custom of anointing the body, still retained among some half-civilized and savage nations.

The lungs may also afford an inlet especially to those which act primarily on the blood. Nor would I deny altogether the liability of the mucous membrane of the digestive tube to receive the earliest impressions of febrific agents—a point recently so much labored by the French or physiological school of pathologists, though I will avow that it appears to me the least obvious and most indirect of all the modes of invasion yet suggested. This tissue must be already in a morbid condition to be affected by the ordinary articles of food and drink; and as to the admission of aerial poisons diffused in the atmosphere, the opportunity must indeed be slight, if it depend upon mixture with the saliva, so little of which is usually swallowed by persons in health; except at the times of taking food.

We may conclude here this brief discussion of the general subject of fever, with an enumeration and cursory description of its consequences, or the effects of febrile disorder upon the several organs of the body assailed in its progress, as manifested in examinations post mortem.

The brain rarely fails to present the signs of vascular engorgement, and very often shows the results of inflammation in greater or less degree either of its substance or membranes. This occurs so generally that inflammation of the brain and membranes is considered by a pretty numerous class of physicians, with Clutterbuck at their head, as the true proximate cause of fever. Numerous facts have been brought forward to establish this conclusion, which has been very plausibly advocated, and much ingenious reasoning employed to explain away the difficulties and exceptions adduced by its opponents.

Analogous marks of lesion in the mucous membrane of the stomach and intestines, have occasioned this tissue to be in a similar manner selected as the seat of an inflammatory irritation alleged to be the proximate cause of fever, or rather fever itself, for such is the doctrine of Broussais and his followers. Nor do the other abdominal and pelvic viscera escape during the tumults of this pervasive malady; though, as we shall hereafter inform you more in detail, they exhibit these disturbances rather in derangement or suspension of their functions than in any material alteration of structure. Yet we can observe occasionally not only engorgement but inflammation with its results in the liver, spleen, kidney, and bladder.

The respiratory organs also suffer in fever, though not so generally or in so striking a degree as the viscera above spoken of. Pulmonary congestion is often one of the early symptoms of the attack, but in a majority of instances it undergoes a spontaneous solution, during the successive changes of action and determination.

It is assumed that these local febrile affections are usually of the nature of inflammation, or display an almost irresistible tendency to run promptly into that condition. The opinion certainly derives strong support from the phenomena exhibited in fatal cases of protracted duration. In these we almost invariably meet with inflammatory disorganizations. On the other hand, it is contended that these are incidental and not essential results, as they are not found to take place in the most violent attacks if they terminate unfavorably after a brief course. Here no lesions are discoverable. In still more numerous instances we find the determinations to and affections of particular parts to be clearly and simply congestive, and these are among the most mortal and malignant of febrile modes of derangement. Still further, it seems to me reasonable to regard many, if not most of the determinations that occur in the course of an ordinary attack of fever as simply irritative, in contradistinction to inflammatory and congestive conditions of parts. The numerous headaches, spinal and muscular pains, and gastric oppressions and annoyances connected with fever at particular stages or periods, subsiding rapidly and often disappearing altogether when these stages are past, are, I should think, clearly of this character. In different seasons, climates, and localities, and in different types of fever, we find these several local affections differing notably. Some of these variations appear to be incidental, while others are uniform and essential, occurring in masses, and showing little respect to individual peculiarities of constitution.

We are much assisted in forming an idea of the comparative liability of the several organs to febrile lesion, by an examination of the instructive tables published by the physicians in attendance upon certain large hospitals. Three of these I copy, as follows:—

Crampton, in his history of an epidemic fever in Dublin, gives an estimate of the relative proportion in which the different organs were affected. Out of 755 cases—

550 showed injury of the brain and its membranes.
129 " " of the thoracic viscera.
76 " " of the viscera of the abdomen.

Southwood Smith, of the London Fever Hospital, gives a table of what he styles the "proportions of internal characteristic affections." Out of 300 cases—

79 were thoracic.
66 " cerebral.
60 " abdominal.
95 " mixed.

Dr. Tweedie, a writer of high respectability, publishes, in the English *Cyclopædia of Practical Medicine*, the following precise and definite statement:—

Out of 521 cases (likewise in the London Fever Hospital)—

114 were complicated (as he phrases it) with cerebral affection.
103 " " with thoracic affection.
71 " " " abdominal.
26 " " " cerebral and thoracic affection.
30 " " " cerebral and abdominal affection.
14 " " " cerebral, thoracic, and abdominal affection.

While 168 were simple or uncomplicated with any local affection or lesion.

I regret to say that I am not able to offer any general tables of this kind, kept in our own country. It may safely be asserted, however, that in the fevers of North America we find a majority of the lesions presented in the viscera of the abdomen. The mucous membrane of the stomach and intestines very rarely escapes injury in cases protracted to any length. The liver undergoes frequent and impressive changes of color and condition; and the spleen is very often enlarged, indurated, and softened.

The next greatest number is of the cerebral affections, and these are met with in attacks that prove rapidly fatal, and such as run into a typhous state. Comparatively few lesions of the pulmonary organs take place in the genial climate of the south and southwest, and though not absolutely confined to the winter season, usually occur during cold weather. They are more numerous in the northern and northeastern States and in the unsettled months of early spring.

TYPES OF FEVER.

The difficulty of presenting exact definitions has always been acknowledged by the scientific pathologist. Description is far easier; yet even the most graphic portraiture of diseases has been found insufficient for the purpose of clear diagnosis, and complaints are universally made on this subject by every systematic inquirer.

The truth of this remark is most strikingly exhibited in the numerour discussions concerning the forms, types, and varieties of fever; while, on the one hand, the most minute distinctions are attempted to be drawn, separating groups to all appearance closely allied; on the other, we find avowed the disposition to link together, as identical in their essential characteristics, classes that seem widely distinct. In the study of fevers we are, from the very commencement, struck more forcibly with the differences between them than with the points of similarity. We are apt to think, as Andral said of inflammation, that *the word is too wide*, and covers too many conditions. Compare, for example, a habitual intermittent or a hectic, on the one hand, with a malignant typhus, a congestive remittent, a case of smallpox, or one of yellow fever. How wide the distinction which separates each from every other! Yet it is curious to observe how very generally the primordial unity of fever is asserted; and the existence of a "febrile element," identical under all diversities of external history and phenomena, assumed. "Fever," says Copland, "is but one disease." "The general pathological cause in fevers as in inflammations," says Paine, "is essentially the same." It is also curious to notice how widely writers differ as to the number, varieties, forms, and types they recognize. Southwood Smith denies the existence of more than one continued fever in Great Britain. Jenner more recently treats of four. "We can scarcely touch upon this subject of fever," says Holland, "especially the idiopathic, without finding in it a bond by which to associate together numerous forms of disease; but withal, a knot so intricate that no research has hitherto succeeded in unravelling it." While most dwell on the distinction between intermittents and remittents, and those above alluded to, it is by some entirely overlooked or denied to exist. In our own country, where periodical fever cannot be thus slighted, and where the difference which separates it from the "continued" is as prominent as it is familiar, Bartlett declares that he does not "know anything of any other distinct fever than typhoid; typhus; periodical, in its forms of intermittent and remittent, and congestive; and yellow fever." In Fenner's *Southern Medical Reports*, tables of mortality are given, upon which sixteen nominal varieties of fever are enumerated; yet the able editor does not hesitate to announce his opinion, "that all the forms of fever seen during the late sickly season" (the results of which are set down partly in those tables), "were but varieties of some one general disease." In Africa, where one would think the well known violence of febrile affections would impress the most marked features of distinction upon the several classes, we meet with the same or greater difficulty. Here, all the peculiarities elsewhere considered characteristic of two or more varieties, are condensed into the history of one form—the periodical; and a clear diagnosis seems hopeless and unattainable. The overpowering force of the cause seems to have crushed the system beneath the point of even so much resistance as would give direction to the course of symptoms. "The fevers of Africa," says Bryson, "are, strictly speaking, only divisible into two kinds, namely, into the remittent and intermittent. The former, however, may be subdivided into the endemic, epidemic, and contagious; but, as either of the former may be converted into the latter by improper ventilation, the depressing passions, and physical prostration, and as it (the contagious) does not originate, or even exist for any length of time except under these conditions, the subdivision is again reduced to two heads, the endemic and epidemic, both of which are remittent." "The names applied are totally devoid of any definite or distinct meaning—as jungle, mixed, and coast fever. The bilious remittent of one, is the climatorial of another, the endemic of a third, and the typhus icterodes of a fourth; the adjectives, ardent, yellow, congestive, inflammatory, are all used in describing the same disease. The synochal of one day may become a remittent on the next, and ere long terminate in an intermittent; the ephemeral of little force may suddenly become one of high vascular action, or pass rapidly through this stage, and enter at once upon the typhoid." Mr. H. Landor, late colonial surgeon to the Gold Coast, gives utterance to similar views: "It seems to be the general opinion," he tells us, "that there is only one fever poison, and that local or atmospherical circumstances determine the type the disease will assume in each epidemic. The poison of fever arises from some general cause not yet known."

If thus we regard fevers as consisting promiscuously of numerous types, or forms, all of which, arising from the same source, may appear together, there can be little or no interest in the investigation of the subject of types in fever. Nay, more; if we cannot find palpable, marked, and constant distinctions between the several varieties of fever, a similar confusion can scarcely be prevented from extending far more widely, on the application of the same principles of reasoning, and we shall be scarcely less embarrassed by the effort to distinguish fever from other diseases, than to separate its several forms, each from the others that resemble it. Under this expansive name, indeed, have been included so many and such diversified maladies, that it becomes absolutely necessary, by some mode of limitation, to circumscribe the field of the discussion. Idiopathic fevers are those alone whose history I shall inquire into in this place. Throwing out of view here the acknowledged phlegmasiæ, notwithstanding the essential presence of a "*febrile element*" in their course, I shall pass by all the varieties of symptomatic fever, which puts on many diversities of character, being continued and intermittent, inflammatory and congestive, simple and sometimes malignant. Puerperal fever, which lies on the debatable ground between the phlegmasiæ and the true contagious fevers, and is especially limited by narrow conditions, shall be also left out. Nor shall I consider such of the profluviæ as are essentially pyretic, although many of them are regarded as presenting strong claims to be placed in this connection—such as dysentery, Sydenham's "febris introversa," and cholera asphyxia, by a very large number of my brethren on both sides of the Atlantic, maintained to be a malarial fever.

It is a matter certainly of much importance to determine what is *type* in fevers! and if there be any definite characteristic to which the term is applicable, to ascertain the mode in which it originates, and the contingencies which influence it. The word itself is habitually employed by writers in the most indiscriminate manner. At one moment it is used to separate the intermittents, divided only by periods of time, as we say the tertian "type," the quartan "type," etc. Again, we speak of the inflammatory and typhoid "types," with very widely different purpose; so also, a mild and malignant "type," a simple and congestive "type," are phrases in familiar but uncertain use. Yet however diverse its application by different writers, and by the same writer at different times, it is evident that it is always employed to point to something characteristic. Thus, the periodical are set apart from the continued fevers by a feature clear and palpable enough. "The Ephemera," says Paine, "may be taken as the general type of the entire family of fevers;" and a little afterwards, "according to the interval, so is the type."

"The types and forms of fever," Copland tells us in his learned dictionary, "are determined by the following circumstances." He recites then a long series of contingencies, beginning with "the previous health," including "the specific miasm or cause producing it," and ending with the "treatment or regimen." "These circumstances," he affirms, "both determine the particular form, the type, and the complications of fever, and change one type into another." He goes on to enumerate "six types or forms:" "A. The intermittent"—with its subdivisions of interval and character; "B. The remittent"—likewise subdivided into several varieties; "C. The continued"—under which head are included the inflammatory, synochoid, typhoid, and typhus of writers; "D. The pestilential fevers"—comprising yellow fever, plague, and cholera; "E. The exanthematous fevers;" and "F. The puerperal fevers." It is absolutely impossible that this erudite author should have intended what his words plainly import—a general or universal *convertibility* of type among all the forms of disease indicated. No imaginable contingency, or series of contingencies, can avail to change a bilious remittent into the plague, or a paludal intermittent into smallpox, measles, or scarlatina. The mere suggestion will serve to show that the several examples above given, although spoken of as mere types or forms of one malady, differ in their relations to each other. The word type, then, is too vaguely used, when employed to express promiscuously all these relations; some of which are those of strong resemblance and close affinity; others again of marked dissimilarity, and others still of almost absolute contrast.

I am not prepared to offer exact limitations to the use of the word "type." It must be understood always of necessity to convey some marked distinction. Thus, though it is still disputed whether typhus and typhoid differ essentially, no one will confound yellow fever or a tertian intermittent with either. It is also obvious that while Copland employs the same word "type" to indicate the distinctions between his six classes or forms, he intends clearly that it should separate the exanthemata from remittents, in a very different sense from that which applies to the mere diversities of remittents and intermittents among themselves.

Physicians have always felt a great unwillingness to subject themselves to the charge of ontology, so often tauntingly urged by Broussais against his opponents, and so indignantly repelled. It is difficult to conceive of any malady as an actual substantive existence, and indeed the current of philosophical opinion has of late run strongly in favor of dynamical rather than material views of all physical changes. Disease is thus considered as a condition, or series of conditions, arising under certain influences, as an affection of the tissues modifying their action, or of the fluids their composition, and for the time impairing their integrity, and changing morbidly their mode of being, and their relations with each other and surrounding nature.

The causative agents which develop disease present themselves to us in an infinite diversity of forms. Some of them are undefined though impressive influences, of which we have only a conjectural or rational idea; we apprehend them dynamically, not materially—as forces, not things. Of others, we ascertain the positive and palpable existence; they are poisons, or viruses—animal, vegetable, or mineral, in nature and origin; in form, solid, fluid, or aerial; sometimes reproductive or germinal, and therefore endowed with life, on the one hand; on the other, and perhaps more commonly, inorganic and incapable of self-multiplication or reproduction.

From the first class of causes, which consists of agents for the most part in their own nature innocuous, nay, whose presence is essential to the performance of the functions and the completeness of the organism, arise a large number of maladies. They act—as in the examples of heat, cold, and their alternations, and of varied habits, as to exposure, exercise, diet, and amusements—either because of unadaptedness or excess; the amount and intensity sometimes, and sometimes the abruptness of change transcending the capacity of accommodation in the system. Hence proceed, irregularly, many varied forms of disease that may properly be deemed, in reference to the manner of their production, incidental.

The second class of causes we term, not improperly, specific, and it will be safe to conclude that their effects will be, of logical necessity, also specific. They are so relevant and regular that, when we detect the presence of the cause, we expect the development of a predicable and definite train of consequences; when we perceive the manifestation of the effects, we infer confidently the presence and activity of the cause.

We cannot always ascertain the premises satisfactorily; but when it is in our power to do so, we arrive, without hesitation or doubt, at our conclusion. It becomes, then, important to inquire whether fevers are specific or incidental? If fever is not to be regarded as a unit—on the other hand, is not the word too largely applied to include vaguely and most incorrectly elements and conditions absolutely and essentially diverse? The latter question must, I believe, be truly answered in the affirmative. Fevers differ essentially from each other, and must be divided into classes, as originating, on the one hand, from specific poisons, and, on the other, as arising from impressions injurious only by unadaptedness, expressed in excess, or vehemence, or abruptness of alternation.

Of this incidental character are doubtless many of the so-called symptomatic fevers, and those ephemeral exacerbations or excitements which follow from fatigue, gluttony, intemperance, exposure to solar heat, etc. etc. Here, too, we must place many attacks of catarrhal fever, which, indeed, seems to present a double character, assailing *sporadically* those who subject themselves to night-dews, wet clothes, or sheets, or shoes, a draft of cold air at a broken window or a door ajar, or the heated atmosphere of a full room, or the breathing of chlorine, or of ozone, or the exhalations of a fragrant hay-field; and, again, *epidemically*, when as *influenza* it seizes simultaneously upon its hundreds and thousands, prostrated suddenly under some unknown and doubtfully conjectured specific influence.

In some of the classes of fever, we have clearly enough apprehended the *materies morbi* to which, in its peculiar and characteristic efficiency, we must ascribe all the train of results. No one, it is presumed, will doubt that the variolous virus is a poisonous entity, or that the fever to which it gives rise is a specific effect absolutely *sui generis*, and exclusively derivable from the generative property resident in the fluid of the pustule; as the qualities and modes of being of the oak are derived from the properties of the acorn, or those of the bird from the egg. The same truths, though not so demonstrably palpable, are as logically clear with regard to the other exanthematous fevers, and as to these will scarcely be denied. Reasoning from analogy, we may carry down the inference, with a confidence scarcely diminished, through all the known contagious fevers; and we shall have a greater facility in admitting the specific character of any fever, the more positively we are prepared to recognize its contagiousness, and its exclusive dependence upon contagion for its ordinary generation and extension.

If we admit that contagious transmission is of reproductive character, and implies, of necessity, an individual vitality, either animalcular or vegetable, microscopic and ultra-microscopic, in the germinal virus, we shall hold to the view enunciated above with the greater boldness, and the more uncompromising tenacity. But these opinions have been in modern times steadily, and in latter years rapidly gaining ground among medical philosophers, a large proportion of whom are now disposed, with the sagacious Holland, to contend for the strong probability that we shall find many, or most of our pestilential epidemics, febrile as well as non-febrile, dependent upon the malignant agency of poisonous parasitic life.

It will scarcely be disputed that the various types of fever are associated definitely with, and produced by the influence of the causative agent which gives rise to them, and are referable to the nature and character of the specific *materies morbi* when such a material substance exists. Following the great division of fevers into periodical and continued, the former would seem to be derived from poisons of vegetable and perhaps mineral sources; the latter are of exclusively animal origin. Setting aside for the moment alleged exceptions and questionable examples, we find periodical fevers most rife in fields and woods and fertile plains or valleys sparsely inhabited; while continued fevers devastate the dense populations of cities in their most crowded lanes, courts, and alleys, and infect the holds of thronged emigrant ships, and the close air of prisons and clustering camps. Let us comprise the former under the head of *malaria*, a word now familiar everywhere, and therefore convenient for our purpose, and the latter under the head of *ochlesis*, a term proposed by Gregory to denote the crowd-poison, the morbid influence always generated in ill-cleansed and ill-ventilated places, where men congregate closely, by their living excretions, or their dead and effete excrements—or both.

Malarious fevers are the periodical—emphatically so-called, the remittent and intermittent. These are confined, or nearly confined—I am aiming at an expression of general laws, and will not suffer myself to be turned aside from my purpose by the suggestion of exceptions—to particular and known localities; they are infinitely more frequent in desolate places than in towns and cities, if met with at all as generated in the latter; they affect the several races of men differently in their geographical distribution; they are more rife in low latitudes, and more violent than in temperate regions; they are not met with where the summers are not of a certain heat and duration; they belong everywhere to the hot season, subsiding or disappearing when the weather becomes even comparatively cold; they are almost exclusively endemic on rich soils or low alluvial plains; they cease to present themselves at elevations, as up the sides of mountains, beyond a certain height; they are notably more prone to attack the white than the dark races, the negro, indeed, being in a great degree or comparatively exempt from them; they are not known to be contagious or transportable; that is, they are not liable to arise from any influence conveyed or transmitted from the locality where they originate to any distance from it; they assail repeatedly the same subjects, increasing the promptness of invasion, adhering tenaciously, and readily returning with relapse; acclimation, as protective from their attack, or diminishing the liability to it, is not available to the higher or white race at least, as experience has sadly proved. All these forms, thus capable of general description, thus referable to a common origin, are notoriously mutable or convertible; the remittent subsiding into an intermittent, the intermittent being aggravated into a remittent; a quotidian falling into a tertian or quartan, and these becoming duplicated, complicated, or exasperated into quotidian frequency.

Continued fevers are also closely allied to each other, so that the diagnosis of the several varieties distinguished by name is still warmly disputed. The classification into synocha, typhus, and synochus, is no longer noticed. Southwood Smith denies the existence of more than one type in Great Britain. Bartlett contends ably for two in America; but his views are far from being universally admitted. These fevers are strongly contradistinguished from the periodical by many remarkable points in their history and character. They abound in the densest populations, in some of which they are of perennial existence; if not absolutely confined to crowds, they are comparatively rare in thinly settled localities or open countries; they are most rife in the higher latitudes, or the colder portions of the temperate zones; otherwise they are not limited, either geographically or geologically; they are not known to spare or favor any race or races of men; they are held by most to be contagious; they seem to find their origin in masses of atmosphere confined about human bodies, and are produced *in*, perhaps *by*, human exhalation and excrementition, atmospheres thus inquinated becoming morbific and pestilential; their cause thus generated seems to be transportable, whether in masses of confined air, as in the hold of a ship, or in fomites of whatever material; they are not apt to exhibit relapses in convalescence, though perhaps not absolutely incapable of such return: they seldom attack the same subject more than once, impairing, if they do not destroy, the susceptibility of the system to the action of the morbid cause.

These also mingle and run into each other—by blending and interfusion, as we shall show hereafter—nay, as we might fairly infer from the ever prolonged disputes as to their identity and difference, and mutual relations of resemblance and contrast.

The exanthemata form a class of fevers which, at first sight, would appear to be palpably and obviously separable from all other types, but even here a more careful examination will show that it is not entirely easy to establish and preserve, uninfringed, clear boundary lines between neighboring and connate maladies. Scarlatina has been confounded with measles, measles with smallpox; and this latter, in some of its numerous modifications known as varioloid, is almost or altogether undistinguishable from varicella. Nay, the very characteristic features of the eruptive fevers are so far unsettled that we shall find pathologists of high reputation including under this head all the continued, and some of the uncertain types. Both typhoid and true typhus have been arranged here; yellow fever, which has, indeed, been assigned a position on every line of the nosological catalogue, has been pronounced, by Hildenbrand and others, a true exanthem; cholera asphyxia is also thus regarded by Parkes, Simon, and Horner; and dengue, by some merged into the ranks of the malarious remittents, by others classed with yellow fever, and by Copland and Cooke recognized as a variety of scarlatina, is, to say the least, more closely affiliated here than anywhere else.

Yellow fever also presents strong claims to be looked on as of distinct type, and indeed is recognized, after proper scrutiny, by Bartlett, as a separate form of American fever. It is, indeed, absolutely *sui* *generis;* its history is very peculiar. It has been described as a typhus, on the one hand; on the other, as the best example of the contrasted inflammatory—*causus, febris ardens;* as an intermittent, remittent, continued, exanthematous fever. Chisholm dwells on its similarities, and analogies with the eastern plague. Osgood and some of our southern brethren confound it with dengue; some ascribe it to paludal miasmata, others to ochlesis, and others again to a contagious virus. It partakes, doubtless, of the characteristics of both continued and periodical fevers. Like the latter, it is confined to hot climates and warm seasons of the year, and does not affect localities greatly elevated above the level of the sea; like the former, it prefers dense populations; does not offer relapses, or very seldom; gives a highly valuable immunity from a second attack; is amenable, in a notable degree, to the influence of acclimation—on which topic we shall say more hereafter; its contagiousness is maintained with great energy by numerous writers, repelled with equal zeal by others, perhaps a numerical majority, and the dispute is *ad huc sub judice;* its transportability by inquinated atmosphere, if not by fomites, is now universally admitted. The larger proportion of those familiar with it have assigned it a distinct position, as a specific continuous fever, rarely, if ever, met with, except under the combined influences of both ochlesis and malaria, and strikingly liable to be modified by the cause of periodical fevers; readily impressible, therefore, either at its invasion or at its subsidence, with malarious periodicity, beginning or ending with remissions, or intermissions; liable, also, to put on the ordinary symptoms of its typhoid congeners, if prolonged beyond the usual duration through which its progress is extended.

Catarrhal fever has been refused a place among the idiopathic pyrexiæ by many authorities; but where else can we arrange it? As to its essentially febrile character, we presume that this will not be doubted; but its alleged dependence upon a local irritation, inflammatory in its nature, of some portion of the respiratory tract of mucous membrane, is made the reason for setting it aside among the phlegmasiæ. This objection does not seem to me tenable or sufficient. The local disorder varies in seat and force without changing relevantly, or in proportion, the derangement of the circulatory and nervous systems especially, and generally of the whole organism, which constitutes fever and gives rise to the symptoms massed together under that name. In its more wide-spreading invasions, known as *influenza,* this remarkable prominence of the constitutional disorder, with little or no corresponding local affection of striking or uniform occurrence, is noted by all the authorities. I have already alluded to the singular and extreme diversity of its modes of production. The most trifling exposure will bring on, in many persons, as a matter of course, a sporadic attack which shall run precisely parallel, in symptoms and history, with the great mass of cases of epidemic influenza. Sitting in a current of damp or cool air, or getting the feet wet, will thus bring on the same malady, to all appearance, which at times assails thousands simultaneously and abruptly, under contingencies so obscure and inscrutable as to suggest to philosophical inquirers the agency of myriads of animalculæ, or the progress along the earth's surface of clouds of volcanic dust, or of fungous sporules, or morbid atmospheres of irrespirable or poisonous gases. Contagion, infection, and all skyey and planetary influences, indeed, in all their infinitely diversified forms, have been invoked to account for the sudden generation and wide propagation of this pestilence.

I have endeavored, by the course of reasoning and inquiry thus far presented, to fix upon some definite marks by which we shall distinguish the types of fever, and will now assume the establishment of the following distinct types:—

I. The PERIODICAL: Intermittents and Remittents generally.
II. The CONTINUED: Comprising, 1. Yellow Fever; 2. Typhous Fever, including Typhoid and true Typhus; the Epidemic Fever of Great Britain, Simple Fever or Ephemera; 3. Catarrhal Fever, Influenza; 4. Pneumonia Typhoides, Spotted Fever?
III. The EXANTHEMATOUS: Variola; Measles; Scarlatina; Erysipelas; Dengue.

I am persuaded that the truth will be found, on examination, in the following propositions: (A.) That each type of fever is the result of a definite cause, relevant in its properties, character, and modes of action to the effects produced. (B.) That these causes, varying greatly in nature, must be sometimes similar, and sometimes contrasted; that is, they must vary greatly in the character of their efficiency. (C.) That causes of different kinds or nature may sometimes coexist. (D.) That when they resemble each other, their effects or influences are readily blended, and mingled, and interchanged, as one or the other may predominate. (E.) That when dissimilar causes coexist, they may sometimes act together, but not often; may sometimes blend their influences, but not readily or freely. That they may possibly supersede each other by substitution; but that in no instance can the effect of one cause be the effect of any other cause. This sort of transformation, the only true conversion in the logical sense, is a rational impossibility; whether we regard diseases materially and ontologically as entities, or pathologically and dynamically as mere affections of the organism, arising out of precedent impressions, or from causative agencies.

I need offer no proof of the frequent blending of the types connate in cause and analogous in symptoms. As to the periodical fevers, regarding the mass of subjects, we shall find at the same time, in the same locality, and exposed to the same causative agencies, cases of intermittent and remittent, and congestive fevers of every form and grade. In the same individual a simple intermittent shall be followed by a "malignant," "pernicious," or "congestive" paroxysm, which, if not fatal, will subside into an ordinary remittent promiscuously interchanging. Perhaps the strongest and most marked evidences of these interesting phenomena are found in the histories of African fever, given us by Burnet, Pym, Bryson, McWilliam, and others. An absolute confusion of grade and violence seems to reign. In the same settlement, the endemic fever perennially existing will suddenly become epidemic, pestilential; from simple changing to congestive, pernicious, malignant, vehemently destructive. In the same ship, under the same exposure and general conditions, some shall be seized with a mild intermittent, and others with the most terrible and promptly fatal remittents.

The similar interfusion of the continued fevers, speaking first of the cases in mass, is as easily exhibited; nay, unless we are prepared to set aside the authority of the greater number of those who have in all countries and climates and at all periods treated of these fevers, we shall be forced to admit the difficulty of finding them separate in nature, and keeping them apart in description. I am not prepared to follow a course so harshly critical. I do not object to the nicest diagnosis, the drawing of most delicate and precise lines of distinction. I applaud rather all attempts in this way, and study with pleasure, as well as profit, the essays of Copland, Gerhard, Jackson, Ware, and Jenner. But even in these ingenious and useful efforts at analysis, these vivid delineations of differences, we are perpetually presented with striking analogies, family resemblances, the intrusion of characteristic symptoms, where they were not looked for, and their absence where they were confidently expected. The synocha and synochus, the typhus and typhoid run together inextricably. Partisan advocates of special doctrines often find no reply available but a denial of some alleged fact as a suggestion either of error or carelessness in observation. The impartial judge, the earnest student is not satisfied, however, with this mode of conducting the investigation; and in summing up, for the purpose of arriving at the truth, feels himself under the necessity of regarding with equal eye, and weighing with the same scales the statements on both sides of the question—accepting no "foregone conclusion."

We know, for instance, that in the same emigrant packet will be imported together, true typhus, and veritable typhoid. From the controversial volume of Bartlett we take the testimony of Dr. Power, of Baltimore, who tells us that, "in the Rio Grande, a vessel which brought thither from Europe seventy (70) cases of typhus fever, four (4) of the seamen and several of the steerage passengers had had typhoid. In Dr. Reid's list of one hundred (100) cases, the lesions of typhoid presented themselves in but six (6). Lombard found this concurrence almost everywhere, as shown by the proportion, varying in different localities, of the discovered lesions in bodies dead of the prevailing fever; the absence of the characteristic typhoid lesions marking the cases thus set apart, as typhus and not typhoid."

In the masses, then, this intermingling of types cannot be doubted.

In individuals, an analogous blending occurs as palpably. If there be a "simple fever," ardent, inflammatory, a synocha, we know that by mere protraction, exhausting the vital powers and prostrating the patient, symptoms of typhoid character will be brought on, and lesions closely similar will take place and be discovered *post mortem*. Bartlett himself, while ably and zealously contending for the absolute distinctness of typhoid and typhus, gives with praiseworthy fairness some interesting facts in opposition to his cherished views. Speaking of the history of the local epidemic in the prison at Rheims, published by M. Landouzy, he says: "Most of the circumstances correspond to the phenomena found to occur in typhus fever. But in six (6) autopsies which were made, the intestinal lesions characteristic of typhoid fever were present." He adds: "There seems to have been a union in the same cases of many of the elements which are generally found confined to one or the other form of continued fever." In another place he says with equally creditable impartiality: "It is impossible to read the detailed and elaborate work of M. Gaultier de Claubry" (which received a prize from the Royal Academy of Medicine at Paris, in 1837), "without being convinced that many of the epidemics prevailing in the armies and prisons throughout various portions of the continent, from 1804 to 1814, corresponded in all respects to typhoid fever, while in other instances the disease was the true Irish typhus." Indeed, the interfusion was so perfect and complete, that the author of the controversial treatise thus referred to, affirms in it, and repeats his conviction in 1839: "That there are no means of distinguishing the two forms of fever, and that their identity is beyond a doubt"—a conclusion as to which we are not called on to express an opinion. But this blending is not confined to the connate types of fever. Holland describes a mild form of typhus with "intermittent symptoms, both tertian and quotidian in type, and often very regular in period; the tendency to which seemed more common when the disorder was abating."

It is matter of familiar remark, that in long protracted cases of the ordinary remittent of malarious regions, there is a diminution of the palpable contrast or alternation of the period of febrile exacerbation and unison, a tendency in the former to continuousness, the latter being less an alleviation of the symptoms, and the several symptoms themselves approaching more and more in appearance those which belong to simple continued fever, nervous fever, or typhoid fever. In common professional language, such cases "take on the typhoid character." On examination, typhoid lesions will sometimes be found in the body dead of bilious remittent. The mucous membrane of the stomach and intestines is highly injected in severe and short attacks. In more protracted cases, follicular ulceration may be found throughout the whole extent of the bowels. I have seen repeatedly such ulcers form in cases retaining their remittent character. In one young adult attacked by autumnal malarious fever in Florida, intestinal ulceration proved fatal after convalescence had advanced sufficiently for him to leave his room, by penetrating the coats of a large vein, and giving rise to immense hemorrhage. Enlargement and ulceration of Peyer's plates have been detected by Drs. Richardson and Bolling —and one case of actual perforation by the former.

Typhus and typhoid often give modification to the eruptive affections, especially when, as with the preceding class, they are unduly protracted, as also when they occur in infirm and debilitated subjects, or in very crowded places; and sometimes, too, in masses, generally from some obscure epidemic influence. Dr. Roupell has described a form of fever which prevailed in the Grampus Hospital Ship in 1831, which he names "febris typhodes rubeolida," from its being accompanied, in almost every case, by a rash like measles. The ready combination of erysipelas with typhus and typhoid is matter of familiar remark. It occurred in numerous cases in the city of New York, in 1847 and '48, and was particularly troublesome in some of the hospitals thronged with sick emigrants.

Our third head of exanthematous fevers presents many strong examples of concurrence and mixture of characteristic features. If variola and varicella be distinct, cases often happen which offer such appearances, that we scarcely know how to name them, and therefore we class them under the head of varioloid. If vaccine is not the original variola, its influences are sonetimes strongly incorporated with those of the smallpox virus—each of them undergoing modification sometimes—and one sometimes arresting or suspending the other, sometimes each holding its own course, little or not at all affected. If scarlatina and measles be specifically different, they often assail the same individual simultaneously, and often coexist in the same community. Nay, they blend so readily and act with such apparent affinity upon each other, that we may affirm, without impropriety, the permanent existence of a sort of hybrid begotten between them. At any rate this is the view taken by one of the most authoritative writers of the age, Copland, who gives a place in his valuable dictionary to rubeola as "a hybrid combining the chief characteristics of both these exanthemata." It is recognized by the Germans under the title of rötheln—it is the rosalia of the Italians. Cases of it were very numerous in South Carolina in 1842 and '43. The ulcerated and inflamed throat of scarlatina were united with the catarrhal cough and sneezing of measles; the gastric derangement was more urgent than is usual in either; the eruption was in points, and rough, irregular in form, and soft or swollen. The renal and dropsical symptoms were not marked.

Scarlatina, indeed, seems readily to mingle with any other exanthem. In a note by Bulkley, in his valuable edition of Gregory, not less than twenty-five (25) instances of its coexistence with smallpox are given from various authorities. When dengue appeared in Charleston, S. C., in 1850, its second invasion of that city, the scarlet fever was just subsiding as an epidemic, and a large number, probably, several certainly, of the earlier cases were taken for, and treated as irregular scarlatina. Similar instances continued to show themselves throughout the season, in which the efflorescence or eruption closely resembled that of the past epidemic, though none of its other characteristic symptoms presented themselves. Indeed the blending and interfusion—may we not without impropriety say, absolute confusion—of types in fever, cannot be more strongly illustrated than by the history of dengue. The malady known by this name, and recognized as an exanthem by the majority of the physicians of our southern cities, described by most who wrote of it, as by Arnold, of Savannah, and Campbell, of Augusta, as identical with the epidemic of 1828, was by others considered as altogether distinct, an eruptive affection, *sui generis*, by others as a peculiar rheumatic fever of which muscular pains were the prominent characteristic, and which was therefore denominated by Rush, "breakbone fever," and by a few, as a mere modification of autumnal remittent. Osgood, in Havana, considers its specific cause to be the same as that of yellow fever. Porter, of Sullivan's Island, regards it as "a plain bilious remittent fever," in which light Forry viewed the epidemic of 1828, and Rush's "breakbone fever" of 1780. Dunglison, a most competent judge of the data afforded him by those who described the disease in 1828, speaks of it as "a singular variety of rheumatic fever." Copland, an umpire of equal authority, decides it upon the same data to be a variety of scarlatina. Fenner says on this subject: "We find the most respectable physicians expressing entirely different opinions respecting the principal type that prevailed (in the city of New Orleans) in August and September, 1850—some calling it yellow fever, some a bilious remittent, to which they gave the sobriquet of '*breakbone*,' while others called it 'dengue.'" From the same source we learn that "this term dengue came greatly into vogue in the city (N. O.) in the summer of 1848, when there was a great deal of epidemic fever of all kinds, but with *types indistinctly marked*. The fevers of Natchez and Vicksburg were of the same general character, and went most commonly by the name of 'dengue;'" yet Drs. Stone and Magruder maintained, although they saw cases attended with eruptive and arthritic pains that continued many days, that the prevalent fevers were nothing but unusually mild and somewhat modified forms of the customary endemic fevers. We can scarcely wonder that Dr. Fenner should have been led to the conclusion "that all the forms of fever seen during the late sickly season were but varieties of some one general disease." In the tables which he gives us, however, there are *sixteen* nominally different fevers enumerated. That a particular modification of fever prevailed as an epidemic in 1828 on our southern coast, to which the name of dengue was assigned, is well known. That it was a distinct and peculiar malady, *sui generis*, seems as readily and fairly to be inferred from the unprecedented universality of its spread, and its singular and happy want of fatal tendency. In some localities it was attended or accompanied by other diseases—as in Charleston it was immediately followed by yellow fever—which observed their usual history, and occasioned their usual proportional mortality. It is also known that an epidemic prevailed extensively over the same region in 1850, which many believe to have been the same disease, and which is very generally recognized under the same name. The same remarkable universality of attack, and the same fortunate absence of fatal results, are recorded of it as of its predecessor. To call these epidemics by any title employed to designate diseases of average mortality, involves a striking and obvious inconsistency. The cause of any endemic or epidemic affects a greater or less number of the population exposed to its influence, proportioned to the two elements of intensity and predisposition. But no pestilence whatever, neither smallpox, nor plague, nor yellow fever, nor cholera, assails so large a proportion of any population as dengue has done on the two occasions of its prevalence. Influenza alone approaches it in this respect; and influenza is almost the only febrile affection which has not been mixed up with it; yet even influenza has never been quite as universal, and produces a very different effect upon the tables of mortality, being not free from directly fatal influences, and always adding largely, though indirectly, to the list of deaths. Predisposition in dengue, and the same may be said of influenza, is either unnecessary or universal. There is but one element then to be considered in accounting for their prevalence—the force or intensity of the cause, and this must be exceedingly great—whether we look upon it as a specific *materies morbi* or a mere concurrence of undefined incidental contingencies, calorific, electrical, or hygrometric.

It would appear, therefore, altogether illogical and unreasonable to speak of a disease, so universally prevailing over every kind and character of constitution, respecting no barriers of acclimation, or sex, or age, or habits of body, as a *mild* variety of any known disease. Dr. Porter reports eighty-one (81) cases in Fort Moultrie, leaving but six (6) persons unattacked, and no death. He styles it bilious remittent. Dr. Duperrier gives us a very interesting description of the epidemic as it existed in New Iberia, Louisiana. He, too, terms it a bilious remittent, and considers it to "bear a strong resemblance to the dengue of Dickson, the breakbone of Rush, and a mild epidemic of yellow fever." He treated two hundred and fifty cases (250) without a death; only four (4) adults in that vicinity escaping; children from infancy to five or six years making up the remaining number of exempts, not more than forty (40) in all. Arnold, of Savannah, a very capable observer, saw it mingled with the usual autumnal endemics, both remittent and intermittent type, "cases of each lying side by side, each running its course unmodified;" he had "no difficulty in diagnosing it," and testifies also "that it is a disease of no fatality." Dr. H. F. Campbell, of Augusta, estimates the number of cases in that place at from eight to nine thousand (8,000—9,000) without a single death. Yet from his graphic description we may fairly infer, that in that locality, which yellow fever has but twice invaded, the epidemic offered a greater resemblance than anywhere else, in hemorrhagic tendency, gastric disturbance, &c., to Copland's hæmagastric pestilence.

Surely, if fevers be distinguishable by constant characters, so as to justify the separation of them under different names, heads, orders, classes, or in any other way; if there be indeed a possible distinction of *type* in any definite sense, we have here portrayed a peculiar and specific type of fever. But here, also, we find our most satisfactory illustration of the blending of characteristic features—the intermingling of separate types; dengue added to the catalogue of ordinary epidemics, superimposed upon them; coincident with them; sometimes easily distinguishable throughout, sometimes so thoroughly interfused that the most experienced practitioner found the diagnosis obscure and inconclusive.

Nothing can be more clearly established than the specific nature of yellow fever; and when we find it coincident and mingling with, and modified by other forms, of fever, we have obtained indisputable examples of the blending of distinct types. But nothing can be more frequently or easily proved than this occurrence; the cause of yellow fever does not seem to be hostile to, or incompatible with, any other cause of disease whatever. It never, as Rush affirms of epidemics, as a general law, "drives out other diseases;" though, to use his phrase in continuance, it often "forces them to put on its livery." In our own country it coexists *epidemically* and *endemically*, with both intermittents and remittents, and has concurred with cholera in New Orleans and Havana. Irvine tells us that it does not often show itself as an epidemic in Charleston, when our ordinary bilious remittent prevails extensively, and the statement may be correct; but such coincidence does sometimes happen. This was remarkably the fact in 1827 and in 1835. In the year 1839 the city of Augusta, upon the right bank of the river Savannah, in Georgia, was for the first time invaded by yellow fever. The first published notice of the existence of a grave form of fever contains, on the authority of the mayor, a positive declaration, "that having consulted the medical gentlemen of the city, in relation to the character and supposed origin of the disease, the faculty have reported that it varied in no material features from those frequently exhibited in the ordinary summer and autumnal fevers of all southern climates; that it was neither contagious nor infectious; that it was confined to narrow limits, and originated in some local causes which have since been removed." A call was afterwards made for a general meeting of the physicians, and the following report was issued by the Board of Health—we also declare "that the disease is the bilious fever of the season and climate, aggravated by some local causes, and that but few of the cases occurring can be termed malignant." Here we have the first foreshadowing of the public terror as to the character of the epidemic. Before the termination of the season there was no dissenting voice to the universal admission, that the epidemic was, and had always been, yellow fever; and at the present time it is not by any one doubted, that it was yellow fever in all its characteristics. How complete and thorough must have been the "blending" of symptoms in this impressive history, thus to disguise under the mask of common and familiar features, a new and terrible enemy. Lewis, of Mobile, describes yellow fever as remittent and intermittent, the latter more fatal than the former. He speaks of seven cases in 1842, which he calls "congestive," as simulating yellow fever, "marked by the symptoms of congestive and yellow fever, and occurring in persons who had been living in malarious regions; they constituted," he says, "a perfect example of the blending together of the different poisons, so as to produce a disease of mixed character." Thomas, in his *Traité sur la Fièvre Jaune Observée à N. Orleans*, maintains that "the miasm which causes it is a *mixed one*;" he considers it "a continued or a remittent pyrexia," and denies its ever being properly intermittent. Lempriere describes a modification of yellow fever in Jamaica, which he calls "a variety of the disease grafted upon the remittent;" he also admits "the existence of a distinct disease in the West Indies, usually showing itself in crowded ships, partaking of the character of both yellow fever and typhus, and like the latter, contagious." Blair, in his *Essay on Yellow Fever, in Georgetown, British Guiana*, from 1837 to 1842, maintains it to be "clearly specific and *sui generis*;" but goes on: "The intermittent malarial fever is so powerful here, that the yellow fever epidemic could not entirely supersede it; and we sometimes found it engrafting itself upon the weakened convalescents from yellow fever; and, in a few cases, it seemed to dispute possession of the victim, and in some modified the procession of symptoms."

The same phenomena have long since been described by myself as establishing "the actual intermingling of the types of fever in malarious climates, and their supervention one upon another. In any of the localities where yellow fever is endemic, a remittent or intermittent may at any stage of its progress assume the malignant character of the prevailing pestilence when locally epidemic. In the summer of 1817, many northern and foreign sailors had been induced to go as boatmen up our rivers; considerable numbers of them were brought into our hospitals with country fevers, both remittent and intermittent, which, as soon as yellow fever became prevalent, ran into that epidemic; the fever becoming continued, and black vomit ensuing."

Dr. McArthur tells us that "many cases of remittent fever under his care terminated in the endemic of yellow fever."

If we turn to the reports from the African coast, we shall find the same blending, or—shall we repeat the phrase—confusion of type, matter of common remark. A few notices relevant to the present portion of our topic may be extracted from among the large mass collected by Bryson. "The character of the fever (at Fernando Po in 1829) was similar to that of Sierra Leone, and other parts of the coast. It was distinctly remittent, accompanied by yellow suffusion of the skin and eyes, and black vomit." "The *Dryad* arrived on the coast on the night of the 7th of November, 1820. On the passage out two men had slept on shore one night at Port Praya, on the island of St. Jago. One was seized on the 10th day, the other on the 18th. One assumed a tertian intermittent form, the other ran through its course with all the violence of the yellow remittent of hot countries." "In the *Conflict*, at Sierra Leone, in 1830, the disease was remittent, varying in symptoms, of a most malignant character in the worst, attended with great excitement; as it advanced, the skin assumed a yellow color, interspersed with livid spots." "Toward dissolution, in the fatal cases, a quantity of dark matter was vomited. In the *Buzzard*, the fever was remittent, each case being marked by two distinct daily exacerbations, one in the morning, the other in the evening, the latter the most severe, lasting until midnight. The disease assumed a malignant type, attended with black vomit. In the *Hydra*, the fever seemed to assume two forms, mild and malignant." Landor, colonial surgeon to the Gold Coast, already quoted above, tells us that the "African fever on that coast generally puts on the intermittent character markedly, yet in bad seasons it becomes remittent, and, in most of the rapidly fatal cases, is continued; and occasionally it assumes even the appearance of yellow fever, with the coffee-colored vomit and a yellow skin."

Of the blending of catarrhal fever in its epidemic form, influenza, with the other types of fever, the examples are almost indefinitely numerous. Sir George Baker describes the epidemic of 1762 as exhibiting "the intermittent type." He notices also in the same remarkable influenza the "tendency to angina, and erratic efflorescence of the skin." Holland, in his *Essay on the Connection of certain Diseases*, comments upon the frequent "concurrent presence of influenza with scarlatina and measles," and refers to "a class of cases of very singular and ambiguous kind, having many appearances analogous to each of these disorders, but particularly scarlatina;" he suggests "the question whether from the concurrent action of different morbid causes, or from one virus capable of producing different forms of disease, according to the texture on which it fell, or other less obvious causes;" concluding with his usual judgment—"if hazarding an opinion, it would be in favor of the former view."

A curious case of conversion of influenza is related by Leonhard, of a woman of Muhlheim, in whom an attack of influenza, the severe epidemic of 1837, passed into a local quotidian intermittent, affecting "first the left, afterwards the right arm, with every successive symptom of regular ague, the rigor, heat, and stage of perspiration all distinctly marked in each fit; the disorder cured by quinine."

I cannot for a moment admit the truth of the modern doctrine, that "fever, or, as it is termed, the *febrile element*, is a unit," identical in all the forms of that protean malady. On the contrary, I am prepared to maintain that from the great diversity of specific causes of fever a great diversity of specific effects must necessarily result; and that as the effect must always be precisely relevant to the cause, unless the latter undergoes modification, transformation, or substitution, the former must remain unaltered. Specific difference in causative or generative agency, will give absolutely specific difference in results. If, for example, some fevers are contagious, and not all, this single fact must constitute of itself an essentiality of diagnosis. Contagion, speaking of it materially, not dynamically, must in the present state of our knowledge, be assumed to be an organic germ, vital, reproductive, and self-multiplying. It is a vital organic germ, because reproductive and self-multiplying; these properties are predicable of no form of dead or inorganic matter. It follows, therefore, clearly and logically, that contagious types of fever, if any exist, are divided *toto cœlo*, from non-contagious types of fever, if there be any such. But the existence of both is universally recognized; it is known that they may co-exist, occurring together in the same locality, the causes of both being present there; they may be blended together, their causes conjointly or simultaneously affecting the same subject. We cannot imagine these causes or effects to be convertible in the precise and logically accurate sense, by any possible mode of transformation, under any conceivable force or influence; but we know them to be in many cases super-imposed upon, and substituted one for the other; in some instances a total subversion of one by the other seems to take place, the first disappearing in all its characteristics, and the second prevailing with despotic and exclusive sway. Such conversion is not, we repeat, a rare occurrence, and may happen universally, as between any two of the diversified forms of fever.

Where types differ by some characteristic or prominent quality, or feature, less marked than the well-defined property of contagion, it becomes less easy to trace or establish a diagnostic or separating line between them.

It is not difficult, however, to prove that all specific fevers are equally peculiar and distinct, as arising from specific causes of exclusive and definite morbid force. Thus, if we are right in the almost universally received opinion, that certain fevers—the periodical—derive their existence from an unknown poison, which we denote as X, or choose to call *malaria*, as a mere name serving to distinguish it, which poison we find to be generated more actively and abundantly in the neighborhood of swamps and jungles, and exclusively in hot climates and seasons, and as readily in desolate and uninhabited coasts as in the settlements where men are resident; and further, that certain other fevers are occasioned by another poison that we denote as Y, or choose to call *ochlesis;* which poison is generated as readily in cold climates and seasons as in hot countries and in the summer months, and more actively and abundantly where men are most crowded together, then surely we have a right to reason, from the contrasts so presented, that the distinctions are absolute and essential which separate true typhus from simple intermittent. Yet a patient falling into typhus, or recovering from it, may exhibit the periodicity and other characteristic symptoms of malarious intermittent; but this must and will only happen when he has been exposed to both the poisons, X and Y: the latter of these cannot and never will produce the effects of the former, and *vice versa.*

The cause of typhoid fever, as controversially distinguished from true typhus, has not been clearly pointed out. By some it is attributed to the same circumstances that give rise to its congener; others affirm that it may arise in the pure air of the country, and in well-ventilated apartments; some affirm and others deny its contagiousness. As a continued fever, it is usually very fairly separable from bilious remittent; yet this latter frequently puts on some of its most familiar and characteristic features: a dry, red tongue, meteorism, muttering delirium, carphologia, and coma, presenting themselves in protracted attacks; the teeth and lips being covered with dark sordes; diarrhœa coming on, and after death ulceration of the intestinal mucous surface being discovered. We are not prepared to say that these cases become contagious; but some who hold to the specific distinctness of typhoid, deny its contagiousness. They are not all maculated or petechial, but the exanthematous character is not shown uniformly in typhoid cases. Here is one of our most obvious cases of conversion of type, or, where the substitution is not complete, of obvious blending. But there are many instances in which the periodicity of the first stage is totally lost, the patient, in the language of an experienced southern practitioner, "wading through the disease," and in such subjects we have observed that the recovery is not apt to be embarrassed by the tendency to relapse or recurrence, which belongs so emphatically to malarious fevers under other circumstances; nor to be followed by jaundice, or splenitis, or dropsy, in the proportion otherwise to be apprehended as the sequelæ of that class of tenacious affections.

In all the southern Medical Journals of recent date, we find it stated that throughout our whole malarial middle country, and indeed somewhat, though less strikingly, in our lower alluvial districts, typhoid fevers are becoming more and more frequent in places and settlements, and under circumstances, where hitherto the ordinary autumnal remittents prevailed exclusively. In certain localities, the congestive forms of intermittent and remittent have seemed for the past eight or ten years to have been gaining ground, and now to be giving way in their turn to the newly observed type; and some physicians have regarded it as a sort of intermediate link between, or transition from, common malarious fever to the typhoid type.

This conversion or substitution—we shall lay no stress upon the word—is in certain instances supposed to be accounted for by the mere supervention of a peculiar condition of prostration, depression, impairment of vitality in the subject. This may result either from previous disease or from contingencies which act more obscurely upon the constitution without developing any open malady, giving rise, as we say, to a predisposition.

It is farther suggested that certain diseases, certain types of fever, possess a sort of relevancy or correlation, through and by means of which they determine or create a predisposition to each other. In a recent article in the *British and Foreign Review*, July, 1851, the writer asserts of the "relapsing fever" of Jenner and other English physicians, a newly recognized form of continued fever, that "it predisposes to typhoid, and that typhoid in turn predisposes to relapsing fever." It is easy to believe of these types, so closely correlated and connected, even if distinct, that they should be substituted by or converted into each other. Yet it is clear they cannot, as some have argued, be identical or the same, because typhoid does not predispose to itself, but notoriously indisposes, or diminishes if it does not take away the liability, to its own subsequent attack. It seems to me unquestionable that, in some sense, whether by mere protraction or specifically, all the known forms of idiopathic fever predispose to typhoid; at least all known forms of fever, if greatly prolonged, put on, as has been above stated, many features which belong to the usual description of typhoid, and sometimes lose all those which characteristically belong to their own average duration and less advanced stages; and which in some instances continue persistently to be strongly marked throughout the most indefinite protraction. This is true not only of those already spoken of, periodical fevers of every variety especially in the congestive form, but of yellow fever, catarrhal fever, nay, the consecutive fever of cholera, and the numerous pyrectic affections which occupy the doubtful ground of such connection with internal inflammations as to render their idiopathic character questionable, such as gastric, mesenteric, and verminous fevers, and the infantile remittents treated of specially by so many writers, and by so many refused a separate place in our nosological catalogues.

In Henle's view of "the transformation of intermittents into contagious typhus and yellow fever," we find this doctrine distinctly stated thus: "By marsh air, sulphuretted hydrogen, negative electricity or any other cause, intermittent fever is produced; by the intermittent the chemical constituents of the blood or other fluids become altered; by this alteration the individual is adapted to receive and support living bodies floating in the atmosphere, which then occasion a new form of disease, and at last the latter may proceed farther as a contagious disease." There are examples enough in which certain forms of fever appear to have led the way or predisposed in a similar manner to typhus—the true or Irish typhus of controversial writers. Ferguson says, "that the fever on board an infected vessel from Trinidad to Barbadoes, from crowding below decks at sea ceased to be yellow fever, and became as truly typhoid (typhus) as any he ever saw; but all that were taken ill after she came into harbor retained (regained?) the character of yellow fever in every respect, and showed not the least of the typhoid type. That the ship was impregnated with a typhoid contagion, capable of infecting others within its sphere," he adds, "I have not the slightest doubt." Here we may infer a mingling of the causes of the two, either of them predominating, as circumstances favored in turn; but, as it would seem, the cause of typhus was not efficient enough in amount or force to develop its influences except in those previously assailed by yellow fever.

Catarrhal fever not unfrequently determines a similar predisposition, and it is not rare to hear of cases of typhus that have commenced with catarrhal symptoms both sporadically induced, and of epidemic origin. A striking example of this transition, substitution, or conversion, occurred some years since in my own practice. A whole family were much exposed to cold and moisture at a forest camp-meeting held early in spring. They were attacked, all or most of them, with common catarrh, which in two, a mother and adult daughter, was attended with febrile irritation, rather violent and persisting. They were brought home, their house being an old one, ill lighted and ventilated, and standing in a narrow alley. After some protraction, the cases assumed all the appearance of true typhus. The friends who attended and nursed them were in several instances seized with the same low fever, and conveyed it to their families in separate and distinct parts of the city; twelve such cases, identical in character, and unquestionably all traceable to the two first mentioned, came under my treatment. No one doubted the contagious character of these attacks, and the history was much more impressive on that account. In southern practice there is far less opportunity to observe the efficient development of the property of contagiousness in disease generally, than in the colder regions of the north. The domestic architecture is modelled chiefly to alleviate the heat of our long summers, rather than to shelter us in our short and genial winters; every arrangement is usually made in houses of the middle and better classes for the most profuse ventilation of every apartment. Large and numerous windows yield an abundance of light too as well as air. All offensive excreta are, therefore, if diffusible in the atmosphere, largely diluted and promptly dispersed, and maladies depending upon ochlesis, either primarily or as concurrent in its influence, apt to be efficiently counteracted. If there be anything, however, which may be dwelt on as proving conversion of type, it is, we repeat, this change in the character of the specific causation from any other generative or creative force, to the peculiar, vital, germinal matter of contagion. This took place indisputably in the instance above related. In the African reports nothing is more common than the repetition of similar statements. "Remittent fever," says Bryson, "frequently breaks out in vessels at anchor, in the ports and rivers, especially if the crews land or are detached on boat service. Under these circumstances it often becomes virulent, and in a few instances seems to have *acquired contagious properties*."

Sir W. Burnett, speaking of the notorious fever of the Bann at the Island of Ascension, considers it to have been "originally the common endemic of the country, which *became contagious* subsequently to the state of the weather preventing ventilation, and from a great number of the sick being confined in a small place." In this view of the matter, his reasonings closely correspond with those by which Ferguson explains the conversion of yellow fever into typhus.

But the most remarkable, and one of the best confirmed in medical writings, is the alleged conversion, on board the British steamship L'Eclair, of the endemical fever of the African coast into a singularly malignant form of contagious fever, to which the title of yellow fever, the true hæmagastric pestilence, has been given in the journals, but recently filled with the controversial discussions which its interesting history has provoked. This vessel, after suffering some months from African fever on the coast, "distinctly remittent," anchored in August, 1845, at the island, previously healthy, of Boa Vista. There the disease, which had been growing more and more malignant and fatal, assumed all the terrible characteristics of yellow fever, affording decided proofs of contagiousness, spreading on shore from place to place, adhering to the vessel and attacking all who joined her, until her return to England in October; the English pilot and a surgeon who came on board of her, being the last of the deaths.

Numerous similar instances might be added, but these shall suffice. Such histories are pregnant with profound pathological and philosophic interest. If contagious diseases can be generated under any contingency whatever (and who doubts the possibility of this occurrence?) and if the matter of contagion is a vital individuality, a self-multiplying germ capable of indefinite reproduction, then the creation or development of this new cause must give rise to new results. A new form of disease presents itself, which either blends with that which pre-existed, or supplants and substitutes it. If the causes are connate and correlevant, "blending of type" takes place, and especially if they are nearly or quite equal in force, and circumstances do not favor the one at the expense of the other. But if they be strongly dissimilar or contrasted, or in any sense incompatible, or if circumstances foster the one and repress the other, then there will be the subversion of the first, the weaker, and we shall have *conversion* of type in the only sense possible and intelligible.

IDIOPATHIC FEVERS.

Idiopathic fevers are divided into the intermittent, remittent, and continued, of which I proceed to treat successively, and in order as I have named them.

The *intermittent* consists of a series of febrile paroxysms, separated from each other by distinct intervals of apyrexia.

The *remittent*, as its name imports, does not present any interval absolutely apyrectic; it is characterized by the occurrence of definite periods of abatement, or diminution of the febrile symptoms, followed by a return or aggravation of them.

Continued fever has been denied a separate existence. It is, perhaps, difficult to imagine a fever so equable in its course, and steadily continuous, as that it shall offer no variation in the degree of violence of symptoms from time to time; yet there is such an obvious and well marked difference between the occasional and uncertain occurrence of such abatement, and the regular, calculable, and characteristic remissions of our second class, that I do not hesitate to recognize the distinction. It appears to me, indeed, as difficult to confound the types of the ordinary remittent fever of our climate and of typhus, as it would be to mistake a quartan for a bilious remittent.

The intermittent has been supposed by some to be the primary type, from which each of the others originates, liable to certain complexities and modifications. This idea is by no means destitute of plausibility. I shall hereafter point out the relations between the remittents of our climate and the varieties of the tertian. Thus, too, the quotidian has been considered the source of the continued fevers, and if we pursue the analogy, we shall be able to shadow forth a vague and indefinite relation of critical days to the quotidian in the first week, the tertian in the second, and the quartan in the third. Nor need we stop in these our fanciful calculations, until we have traced all these periods of exacerbation, remission, and crisis to diurnal and septenary revolutions, and these to the influence of the sun and moon.

INTERMITTENT FEVER.

The paroxysm of an intermittent consists of three stages—the cold, hot, and sweating—the first of which may be regarded as the invasion, the last, as the solution of a febrile attack.

At the commencement of the cold stage, the patient is affected with a sense of languor and muscular weakness; yawns, stretches, and perhaps sighs frequently; his face is pale, his lips bluish or livid, and his features are shrunken. The feeling of cold commences along the course of the spine, as if water were trickling down his back; the extremities are next affected, and the sensation soon extends over his whole body, becoming often so intense as to occasion corrugation of the skin and "rigors," and chattering of the teeth. These symptoms are attended with tremulous shivering of the body, gastric oppression and nausea, and often with headache and spinal and muscular pains.

When they have lasted for a certain length of time, flushings of heat begin to alternate with the rigors, the uneasiness of stomach increases to vomiting, and finally the sensation of heat predominates, and the second stage supervenes, with turgid features, red and watery eye, restlessness and thirst. The pulse, which was at first contracted and apparently feeble, now becomes full, hard, and bounding. The matters vomited, after the stomach has been emptied of its accidental contents, consist of a mixture of mucus and vitiated bile. The duration of this hot stage varies according to circumstances, but at length a moisture is thrown out upon the forehead and breast, which progressively extends over the whole body; and the sweat flowing freely, all the symptoms subside, and are soon entirely relieved.

Such is the ordinary history of the paroxysm of an intermittent, but we meet, in reading and practice, with many irregularities and anomalies. It is not uncommon, for example, to see intermittents without any rigor or cold stage; and some cases of considerable protraction have preserved this peculiarity throughout their whole course.

The books tell some strange stories of these anomalies. Instances are recorded in which the hot stage was known to antecede the cold; nay, one is given from Schenck, in which the usual order of the paroxysm was completely reversed, and the sweating stage took precedence.

Much is said by authors of what they term masked or disguised intermittents, in which all the usual phenomena of the febrile paroxysm are absent, and others substituted in their stead, by means of some inexplicable association. It is urged as a matter of great importance to discern and distinguish such cases, as the proper treatment of intermittents is alone capable of effecting their cure. A pain in the eye, in the head, the abdomen, in one limb, etc., has been observed to recur at regular intervals, and to bid defiance to any other mode of management. It is further alleged that those attacks are occasioned by the specific cause of intermittents, malaria namely, or paludal miasmata. Granting, however, what I am not called on here either to affirm or deny, the identity of the cause producing them with that of intermittents, I am still doubtful of the propriety of classing them under this head; but would prefer to regard them as affections of the parts in which they show themselves, presenting in addition to their usual symptoms the remarkable one of periodical recurrence. We shall find the received catalogue of malarious diseases to be far from a short one, and even where this obscure but powerful agent has not been, to speak correctly, the efficient cause of any disease, it may impress the attack with the character of periodicity either by direct modification, or by the constitutional predisposition it has generated.

But periodicity itself is not so rare a circumstance in the history of diseases as to require that we should refer such as manifest it, to the head of intermittent fevers on that ground exclusively. All classes of disorders may assume a periodical regularity. In 1821, there was a man in our almshouse, whose case was looked upon as a "masked intermittent," in whom the only symptom of the access of the paroxysm, was the regular recurrence of a quasi hysterical disposition to laugh and cry. In 1826, while attending a little girl, her ordinary febrile symptoms disappeared, and a regular attack of colic was substituted, coming on every alternate evening, and continued throughout the night. Epilepsy, asthma, headaches, etc., are met with thus modified, and of the most obstinate periodical character. Nor do I yield the assumed weight to the argument that these maladies require and are best controlled by the remedies for intermittent fever. I do not regard these remedies as narrowly specific or exclusive; on the contrary, they are of very extensive application, and suited to a very wide range of diseases.

Intermittents are subdivided in reference to the periods of time occupied by the febrile exacerbations and their intervals: thus the quotidian completes its revolution in about twenty-four hours, the tertian in about forty-eight hours, the quartan in about seventy-two hours.

They are distinguished also by corresponding differences in the ordinary time of accession, and in the usual duration of the paroxysm, as well as in the relative duration of its several stages.

The quotidian has the shortest cold fit, its access is early in the forenoon; the paroxysm chiefly consisting of the hot stage, is longer than that of the others, being nearly or quite eighteen hours; the apyrexia is of course short.

The tertian commences usually at or about midday, and lasts something less perhaps than twelve hours.

The quartan has a long cold stage, but the paroxysm is a short one, coming on in the afternoon or evening, and lasting about nine hours.

Intermittents are noted for the manifestation of a strong tendency to recur, fixing themselves on the constitution with all the tenacity of habit, and resisting for great lengths of time every effort to expel them. The quartan is most remarkable for this obstinacy. I have myself known it to continue for fifteen years, and instances are recorded of its duration extending to twenty, twenty-four, and, as Good states, even to forty-eight years.

The above are the simple or original types. They are variously complicated, or rather, divided and multiplied, for they never run into each other; with this single exception, that any one of them may degenerate into the quartan. The double tertian and triple tertian are well known. The former is distinguished from the quotidian by the time of access and duration of the paroxysm, and still better by the fact that there is little or no correspondence between successive attacks, but a notable resemblance between the phenomena of alternate paroxysms. Thus, the history of the first and third days, and of the second and fourth, correspond precisely. This correspondence of alternate paroxysms extends sometimes to the minutest particulars. It will not only be shown in the hour of invasion, and the violence of the symptoms, and their duration, but in the organs affected by determination of vascular excitement. In November, 1833, I had under my care a case strongly in point. A gentleman came to me from Darien, Georgia, who had been for some weeks suffering under severe bilious remittent, which subsiding, left behind it an obstinate intermittent of marked double tertian type. On the first and third days, and so on, the paroxysm invaded about eleven A. M., with a harsh rigor, with determination to the stomach, nausea, etc. On the second, fourth, and sixth there was no chill, fever supervening with the hot stage in the afternoon.

There is also a triple tertian, of which I shall say more when we come to treat of bilious remittent, to whose exacerbations its paroxysms often bear a clear relation. It consists of three paroxysms, two of them occurring regularly on alternate days, with a single one on the intervening day. Each of these paroxysms, if noted carefully, will be found closely to resemble in all points its correlative, and may differ very widely from each of the others. A marked case of a rare form, a true tertian triplicata, is well described by Dr. E. S. Gaillard, of St. John's, Berkely, as occurring "in the person of a young man residing on Cooper River. It proved to be extremely tenacious in character, resisting all the anti-periodic remedies administered by the attending physician. The patient, on every alternate day, was attacked by *three* well marked paroxysms, each running distinctly through the several stages; the first attack usually came on a short time after daylight, lasting until 10 or 11 o'clock; the second, some time during the afternoon, usually between 3 and 5 o'clock; and the last about bedtime. The paroxysms were all of the most violent character; and the disease, after resisting all medication, was terminated only by the cool weather of autumn. The patient was reduced to a skeleton, jaundiced, and with an extremely enlarged spleen; he recovered slowly and with the extreme of difficulty."

The books tell us of a double quartan, which I have never met with, and of a semi-quartan, which I am very much disposed to regard as hebdomadal, and ascribe to the influence of the septenary revolution. I have seen a few instances of this sort; it is called by the common people "the eighth-day fever and ague."

The government of Ufa, in Russia, upon the Volga, whose annual overflow gives rise to much disease, is visited in July and August by an intermittent fever, which attacks the patient every seventh day only, but it is so violent that it generally proves fatal.

Cause of Intermittents.—This class of febrile affections is almost universally attributed by the moderns to the impression of malaria exclusively; other agents, to which their occurrence was formerly ascribed, are now regarded rather as merely predisposing, such as fatigue, anxiety, poor diet, moist air, etc. Additional efficiency is given to the influence of the miasm, by sudden alternations of temperature, exposure to cold and getting wet, as in the chilling night dews of warm climates in autumn, and the heavy rains of that season. It is true, however, that some recent writers have attributed to these subsidiary influences the absolute power of generating intermittent independently of malaria. Yet none of the cases alleged as the foundation of such opinions, can for a moment be regarded as decisive.

The intermittents of London, of which James I. and Oliver Cromwell died, and which have occasionally attracted the attention of the profession from Sydenham's time down to 1828, are summarily accounted for by McCulloch, on the received principles. Cases, apparently exceptions, which are given us by Andral also, as occurring in Paris, may be reasonably attributed to the ordinary sources. A great number of cases occurring in our immediate region are secondary, being consequent upon protracted attacks of the ordinary bilious remittent of our climate.

The consequences of intermittents vary with their violence and duration. In some localities, as on the coast of Africa, a malignant modification of this type of fever is met with, which often proves promptly fatal by the congestive determination which affects the vital organs. Examples of this sort are even met with in temperate climates, though very rarely. In general, they are tenacious rather than mortal. But it is not to be supposed that such concussions can be repeated, without the most serious injury to the constitution of the patient. Accordingly, we find his health often irreparably injured by the lesion of some important organ, and death slowly ensuing from consequent impairment of its functions. Most of these evils seem to depend upon the congestions characteristic of the cold stage. Hence we have enlargement and induration of the spleen and liver, which give rise to a long train of maladies, affecting the digestive and circulatory systems, dyspepsia, jaundice, hepatitis, dropsy. Dysentery is mentioned by Jackson as the prominent result of the cases occurring in the English army, which infested South Carolina, during the Revolution, and gained the suicidal victories of Camden and Eutaw.

A curious exception to the disposition of these congestions to affect the *internal* organs was shown in a penis, which suffered during a protracted attack of intermittent, the same or analogous engorgement, enlargement, and induration usually affecting the spleen in agues, being obviously the seat of the congestive determination familiar to that viscus. They possess an erectile structure in common. The case occurred in our almshouse, and was witnessed by a large number of physicians, none of whom, I believe, entertained any doubt of its nature. The history of a case very similar, in which the same organ was attacked with congestion or vascular turgescence, during the paroxysm, was sent me by Mr. S. J. Parker, from one of the interior counties of the State of New York. Prof. H. F. Campbell, of Georgia, mentions, in an able Report, published in vol. xi. *Trans. Am. Med. Assoc.*, two instances of like periodical determination externally, the testicle being the part assailed.

The general *prognosis* in intermittent fevers is favorable, with some allowance for their tendency in all seasons and climates to obstinate protraction, and in hot and moist climates to malignant violence. Vernal intermittents are everywhere more curable than the autumnal. I have mentioned the mortality of the African intermittents. In England and Holland they are attended with little danger. Here, also, they are, for the most part, easily manageable, yet not without some risk both of immediate and ultimate ill effects.

Particular Prognosis.—The favorable symptoms are, ready solution of a paroxysm by sweating, and completeness of the apyrexia; entire freedom from local ailment during the interval; postponement of the expected period of access, and diminution of violence in the invasion. On the other hand, an imperfect apyrexia; the pertinacity of some of the local pains brought on by the paroxysm; anticipation of the time of approach; intensity of cold stage and other symptoms of congestion; violence of determination to important organs, in the hot stage, as to the head and stomach, are unfavorable signs.

The *treatment* of intermittent fever is reasonably and naturally divided into that which is necessary during the paroxysm, the palliative and protective; and that which is proper to be resorted to in the interval, the preventive or alterative. Some modification is required too in reference to the opposite conditions which may attend; the attack being sometimes typhoid, though usually inflammatory, to employ familiar and significant technical phrases. In the latter form, which is infinitely the most common among us, we are not much in the habit of interfering during an ordinary paroxysm, further than with the view of merely lessening the violence of its prominent symptoms, and shortening its duration.

To abbreviate the cold stage, to diminish the vascular excitement during the hot stage, and to induce its prompt resolution by sweating, are the objects of the practitioner. From time immemorial, it has been supposed that the history of the paroxysm and its results would bear a direct relation to, and correspondence with, the intensity and duration of the rigor. Hence the anxiety to put an end to it at once, before it has brought on the internal determinations, congestions, and debility that certainly attend it, and are so plausibly ascribed to its morbid influences upon the constitution. To affect these purposes, it is usual to begin at its earliest commencement, with the assiduous employment of stimulants, both externally and internally. The patient is wrapped in blankets; hot bricks, and bottles of hot water are laid to his extremities, and warm poultices with mustard applied to the epigastrium; warm drinks are given as freely as the stomach will bear, sometimes mixed with cordials and diffusible stimulants. We thus restore the warmth of the surface and the centrifugal distribution of blood in the extreme vessels of the skin, relieving the heart and large vessels of the head, the thorax and the abdomen, from the centripetal oppression under which they must labor. The same results are said to be brought about mechanically by placing tourniquets upon the limbs. The proposer of this plan, Kellie, declares it to be uniformly successful in bringing on promptly a mild hot stage. He supposes it to act by obstructing the downward flow of arterial blood, which being thus thrown back upon the heart, excites it to more vehement and ready reaction. Others attribute its good effects rather to a stoppage of the return of venous blood, "which being confined," says McIntosh, "in the extremities," at least so much of the "congestion in internal organs is prevented." The same author quotes Dr. Foot as stating, that "some Persian physicians apply ice to the surface of the body in the cold stage of intermittents with good effect;" and in India, he tells us, the cold affusion is also employed under similar circumstances. But he surely argues illogically when he infers that he finds here a confirmation of the view taken by him of the *modus operandi* of the tourniquet. Neither the cold affusion, nor the ice, can have any perceptible tendency to detain blood in the cutaneous veins, while they obviously repel it from the cutaneous arteries, thus acting as Kelly imagines the pressure of the tourniquet to act upon the large arteries. This instrument has obviously the advantage of greater safety in the cases of debilitated patients. Cold applications are only admissible when the subject is young and vigorous, and the powers of reaction unimpaired; in opposite conditions, the danger is too obvious to be dwelt on. McIntosh conceiving, like Cooke, of Transylvania, that the cold stage, with all its circumstances and results depends upon what the latter calls "venous congestion," a determination of blood to the large viscera, and its congestive detention there, advises to assist the reactive disposition and operations of the system by venesection, promptly and freely resorted to. He supposes the lancet to act beneficially by immediately soliciting the free distribution of blood, and thus effecting a solution of the oppressive congestions. "The patient is suddenly relieved," he tells us, "from pain, breathes freely, the tremors become slighter, soon ceasing altogether, and with them vanishes the sensation of cold." If he be now properly managed with respect to the bedclothes, we are assured "neither hot nor sweating stage will follow; most of his patients have fallen asleep immediately after the operation, but some of them have got up and dressed themselves." These statements are confirmed by the concurrent testimony of several physicians quoted in his work on the *Practice of Physic.*

I have had no experience with the expedient thus proposed by Dr. McIntosh, and am therefore perhaps scarcely entitled to pronounce upon its merits. Intermittent fevers are not in my hands fatal, dangerous, or unmanageable, although sometimes disposed to be obstinate, and I have not been tempted to resort to a measure apparently doubtful in its influence, and in particular circumstances involving obvious risk. Stokes says that he had made trial of Dr. McIntosh's practice of "venesection in the cold stage on not less than one hundred patients." His conclusions were, that in general it is not unsafe; "in many cases, it ameliorated the character of the paroxysms;" in some, "had the effect of completely arresting the disease, but this last is a rare occurrence;" this favorable termination "did not happen in more than three or four." He saw some cases in which the cold, and others in which the hot fit "was rendered more violent; and several in which the paroxysms were made to anticipate or were brought more closely together." Gill says, that he could convert many cases of intermittent into continued fever by bleeding in the cold stage. Bruguier has cured obstinate quartans by bleeding in the foot, preceded by an indispensable foot-bath, in which the feet must be immersed a quarter of of an hour or more before the period of invasion, and the vein opened promptly when it arrives. The paroxysm, he says, is thus shortened and does not return. A quotidian of many months' duration was thus treated successfully.

A safer practice, the efficiency of which is vouched for by high authority, has been suggested by the theory of the cerebro-spinal origin of the periodical fevers. Professors Ford and H. F. Campbell, of Augusta, the first a very early and zealous teacher of this doctrine, the second, its most ingenious advocate, place great reliance upon the effect of counter-irritation, by mustard, &c., applied along the spine. In the report already referred to, Dr. Campbell gives a letter from Dr. Neal, of Alabama, in which "the complete success in every case" of the exclusive treatment of intermittents "by revulsives to the spine, and the shower-bath," is affirmed.

According to my own observation and opinion, opium is the most important remedy in the cold stage of an intermittent. It may be given in various modes and quantities. I am in the habit of prescribing it at the earliest moment of invasion, or even in cases of regular occurrence a little while previously, in full dose, and most generally in combination with camphor. It seems to me to exert a double influence upon the sensorial and vascular system as a stimulant narcotic. I do not doubt, that I have often seen it cut short or prevent the cold stage, sometimes inducing a pleasant sleep, without febrile symptoms of any kind—sometimes bringing on a mild, hot stage, promptly resolved by copious diaphoresis—an indirect effect of both these powerful medicines. To Drs. Trotter and Lind belongs the merit of introducing this practice.

The familiar domestic custom of administering an emetic immediately before the expected accession of the paroxysm, or at its coming on, may prove eminently adapted to cases connected with great depravation of the secretions; as shown by foul tongue, fetid breath, sallowness of the visage, oppression of stomach, etc. Ipecacuanha is preferable, but if not sufficiently active may be combined with some more energetic article of the class.

The hot stage coming on, a very different plan of management is required. In general, it is not necessary to do more than palliate the symptoms of excitement that show themselves. The head may be kept cool by towels wet with cold water; the thirst relieved by draughts of some refrigerant, or, if the stomach be irritable, with pellets of ice; the chamber kept dark, and cool, and silent. When the sweating stage commences, a slight comfortable covering should be drawn over the patient, and he may then be left to his repose.

In cases of more than ordinary violence, however, we may be called on to interfere more actively to protect the organs assailed from injury either immediate or ultimate. If there be undue determination to the head, the chest, or the abdomen, and the pulse be hard and full, we may find advantage in bloodletting, especially in the early paroxysms, and in young and robust subjects; under different circumstances we must resort to it cautiously, if at all. Other revulsives and sedatives must be employed. Administer a quick saline cathartic, which aid promptly by a large enema. Lay a mustard poultice to the abdomen, if there be gastric disturbance, and irritate the extremities by similar applications, while cold affusion is made to the head, if the seat of pain.

The cold bath is often one of our most useful remedies at this point of time. Nothing abstracts more from the irregular violence of vascular action. It relieves the burning heat of the surface, calms the disturbed stomach, and quiets the throbbing head, and frequently brings on at once the solution of this distressing stage of the paroxysm by sweating. It is not adapted to the cases of old and infirm people, and must be avoided as likely to do harm where there is any pulmonary affection, and where diarrhœa exists.

Dr. Lind recommends the use of opium even in the hot stage of intermittents, asserting its beneficial effects in shortening it, as well as in abating the severity of its symptoms—in bringing on a salutary diaphoresis, with tranquil sleep, and procuring a complete apyrexia. I do not object to the exhibition of the remedy in chronic and habitual attacks, or those which we meet with in old and infirm subjects.

In such cases I have seen it admirably useful. The best formula for its exhibition is the Dover's powder, which it may be well to combine with a grain or two of calomel, or a little rhubarb, to prevent constipation. I would, however, avoid this practice in recent attacks, and in those presenting any marked inflammatory determination, especially if to the head.

I have said that intermittents sometimes (though with us rarely) assume a typhoid character. These are characterized by special prostration of muscular strength and vascular action; there is usually dyspnœa with livid and anxious countenance, the lips are bluish, and the nails and tips of the fingers deeply discolored; there is low and muttering delirium, and extreme mental dejection and alarm.

In such paroxysms our resort to the highest order of stimulants must be prompt, decided, and persevering. Brandy and ether must be administered with laudanum in no timid doses, while mustard and capsicum are applied extensively to the surface, both of the extremities and the trunk. To these external irritants heat will give added effect, and some have advised not only the use of bottles of hot water and hot bricks, etc., but even of frictions with hot turpentine and of flannels wrung out of boiling water. Stimulating enemata are also serviceable; they may be composed of ardent spirits or aromatics, as ginger-tea and the like, or of capsicum and turpentine. The cordial and stimulating diaphoretics, such as camphor and the vol. alkali, may be combined with alcoholic preparations, or with wine whey; and such doses administered as the symptoms require, and persevered in as long as the enfeebled condition of the patient shall demand their support.

Next we proceed to consider the treatment proper during the apyrexia or intermission. Nothing is better known than the difficulty of preventing the return of these forms of fever, when once they have had time and opportunity to fix themselves upon the constitution; but perhaps the best proof of this their characteristic obstinacy, and of the uncertainty of each of our remedies, will be found in a reference to their immense number and variety.

We shall often succeed in the prevention of an expected recurrence [illegible] the use of any means, whether physical or moral, [illegible] make a strong impression on the system of the patient, [illegible] transient it may be. We gain in this way an obvious [illegible] interrupting the train of habitual morbid actions, and [illegible] a series of successive determinations to organs mor-[illegible]

[illegible] been much used with this view, and may deserve a [illegible] be administered just when the calculated hour of [illegible] hand.

[illegible] exciting a new and forcible movement of the organs of [illegible] sensation or thought, or by putting the patient to sleep [illegible] constitutes an incompatible state of the body, and prevents [illegible] is very rare to find a paroxysm of intermittent invade [illegible] asleep. Many prefer, for this purpose, to combine it [illegible] diffusible stimuli—alcohol, ether, ammonia, etc. Any [illegible] is capable of similar beneficial effect. Dr. Heberden [illegible] patient, he says, of an obstinate ague, by giving him myrrh [illegible] dose, ʒij just before the cold fit. Capsicum and camphor [illegible] employed.

[illegible] irritants produce like results, provided they can be made [illegible] enough, and at the proper moment. A very painful [illegible] number of sinapisms, will answer this purpose. On the [illegible] principle, of exciting a strong counter-impression on the body [illegible] mind, however, we explain the vulgar practice of offering [illegible] just before the paroxysm, something specially revolting [illegible] reptiles and vermin, either crushed together or in a [illegible] swallowed. Thus, also, in old habitual cases, the [illegible] adroitly the hands of the clock upon whose dial the [illegible] accustomed to watch the progress of time, and the approach [illegible] period, by deceiving him into the confident belief [illegible] hour had passed by, has been actually known to [illegible] from the looked-for attack.

[illegible] means, we procure an exemption from a regular [illegible] protract the interval to double its usual length, we gain [illegible] already said, by thus interrupting the successive series [illegible] and derangement; the obstinate predisposition [illegible] diminished; the tenacious precision of this punc-[illegible] somewhat shaken.

[illegible] means have been set aside in ordinary practice, [illegible] of remedies substituted, which are supposed to [illegible] specific manner, and which, indeed, produce in [illegible] of cases a most decided, prompt, and happy impres-[illegible] remedies we now proceed to treat, and the first place [illegible] universally conceded to be due to *cinchona*, or the Peru-[illegible] many generations back, the reliance of the profession [illegible] placed upon the administration of this medicine, in [illegible] formula, and the skill of the physician almost exclu-[illegible] prepare the patient for it and to superintend its [illegible]

[illegible] cinchona forms, indeed, an era in the history of the healing art; and the reputation, which after many reverses and much opposition it has finally obtained and long supported, is deservedly of the highest order; there are few articles on the extended catalogue of the materia medica, so fairly and fully entitled to our confidence. Yet the claims which we thus acknowledge must not be admitted without due reserve and reasonable qualification. The bark is by no means an infallible remedy, as some have regarded it, not even under the most favorable circumstances. Nor is it, as is so often taken for granted, applicable promiscuously or in all cases; on the contrary, its use is in some instances absolutely prohibited, and limited by a variety of conditions. Thus the exhibition of cinchona is less beneficial when the apyrexia is imperfect, and where there are present obvious marks of local disorder of some important organ. The continuance of headache, gastric oppression, abdominal pain and tension, these symptoms may demand further general or preliminary treatment. Local depletion by leeches or cups, applied in the vicinity of the part most prominently affected; counter irritation by sinapisms or vesicatories; a gentle emetic, perhaps, or a mild purgative may be required. If there be pulmonary disorder, anodynes and diaphoretics should be employed. If persistent engorgement of liver or spleen, a slow and gentle affection of the system by a mercurial course will be useful. The obstacles to its efficacy thus alluded to being removed, and a perfect apyrexia obtained, we may expect the full benefits of cinchona. Since the discovery of the active principle contained in it, *quina*, or *quinine*, and its extraction by the processes of analytical chemistry, which we may safely pronounce to be the greatest improvement in modern pharmacy, the crude bark of the shops is little used. One of the salts of this alkaline principle is now almost exclusively employed—the sulphate, namely, which, in smallness of bulk, certainty, and uniformity of dose, and freedom from every offensive quality except mere bitterness, is admirably adapted to our purposes. I rarely have occasion to prescribe a greater quantity than from one to three grains, which I repeat at an interval of an hour or two throughout the apyrexia, commencing *as soon as the solution of the paroxysm by sweating has fairly begun*, and preferring the solution in water, made with the aid of sulphuric acid. It is now very common to rely, rather upon one large dose given a short time previous to the expected access of the paroxysm; and our southern and southwestern brethren are in the habit of exhibiting in this way, very extraordinary amounts, and, as we are told, not only with safety, but with prompt advantage. A scruple is given not unfrequently at once, nay, thirty and forty grains, and I have heard of instances in which one hundred to four hundred grains have been swallowed in twenty-four hours. Evil seldom results from this mode of treatment, but it must be regarded as dangerous in its influence upon the brain and nervous system. It brings on sometimes transient blindness and deafness; which have, though very rarely, been known to be obstinate and annoying. I have not found it necessary to resort to it, meeting with no difficulty in attaining my object by perseverance with more moderate doses; at the utmost from 10 to 20 grains. We may, however, occasionally choose to recur to the more ancient mode of administering *cinchona*. The powder will seldom be willingly taken or well borne. Wine is the best vehicle for it, and is indeed an excellent tonic, when sound; and well adapted, when there is present a notable degree of debility.

The infusion of cinchona is still prescribed, now and then, as affording convenient opportunity for useful combinations. Mingled thus with serpentaria, and rendered aromatic by impregnation with camphor, it is especially grateful to many patients, and will be found a cordial tonic and diaphoretic.

Bark is also employed occasionally in tincture, which may sometimes be added with advantage to the infusion, but cannot be given to any purpose alone; in enemata, in baths, and worn in quilted jackets. For endermic medication, the sulphate of quinine is much to be preferred, and exerts considerable efficacy when applied upon a blistered surface.

As quinine and its salts are always of high price, sometimes not procurable, and frequently adulterated, I have thought it advisable to add here a brief catalogue of remedies which, upon good authority, have been offered as substitutes for it, besides those already mentioned above. Where it is at hand in sufficient quantity and of proper purity, I can hardly imagine that anything else can be required, except in idiosyncrasies where, as in Dr. Watt, of Demerara, it brings on some incidental evil effect, a cutaneous eruption, diarrhœa, or great headache.

Quinidine, as it is called, should perhaps be spoken of first. This, which Winkler has proved to be a distinct principle, is found in all cinchona barks, and abounds in the cheaper barks from Bogota and New Granada, which contain little quinine. It therefore costs not more than half as much. Dr. Pepper, among others, reports favorably of it. His usual dose was 2 grains every hour; ten grains sufficed for some cases; others required twenty.

Denarcotized opium is eulogized by Dr. Linn, of Illinois. His dose was from 3 to 8 grains every 6 hours—no matter at what stage of the disease, after the bowels had been moved. There were no relapses after this treatment.

Gentianine is highly recommended by Dr. Küchenmeister, who affirms that it is the most valuable of all the substitutes for quinine, acting as readily upon the spleen. He affirms that 15 to 30 grains twice a day are sufficient.

The *cedron simaba* has been recently brought into use as a substitute for cinchona. It has long been employed in South America as an antidote to the poison of venomous snakes. Dr. Purple, of New York, reports favorably of it, having treated five cases successfully. It is at present scarce and dear, but can be supplied cheaply.

Olive leaves are spoken of by Maltas of Mitylene, as "more effectual than quinine." He boiled two handfuls in a quart of water down to a pint, and gave a wineglassful every 3 or 4 hours.

The *juice of plantain*, plantago, major, minor, and lanceolata will succeed in very obstinate cases, as Dr. Chevreuse tells us—where a host of remedies have failed, even including sulph. quinine in as high doses as 30 grains.

The *peach-tree inner bark*, infused in white-wine, is "the only remedy for intermittents in some localities," as we are informed by Trousseau and Bonnet, who attribute its efficacy to the hydrocyanic acid they suppose it to contain.

Phosphorus, in solution in the oil of turpentine, is proposed by Dr. Schreiter, of Belgium, as a substitute for quinine. Two grains being dissolved in three ounces of turpentine, the dose is 15 drops every 3 hours, in a little barley-water.

Nitric acid has been employed with great success, by Dr. Bailey, of Indiana, in more than 90 cases. He prescribes from 5 to 8 drops, of the commercial acid, properly diluted, once in 6 hours, without regard to exacerbations or intermissions. Fifteen of his cases were tertians, 75 quotidian. In 50 cases there was no return of the chill after commencing the use of the acid. In no case was there a third return. Relapses, he tells us, seldom occur; less frequently than after cure by quinine.

Bebeerine is probably one of the best substitutes for quina when it is liable to any objection. It is less apt to disturb the head or the bowels, but may nauseate. The dose is about 3 to 5 grains.

Chloride of sodium is highly extolled by Piorry, and has been used successfully in our own country by Herrick; its dose is from grs. x to ʒij. Its action on the spleen is said to be as marked as that of quina.

Piperine, a peculiar principle extracted from the black pepper of commerce, deserves to be spoken of in the next place. It is, undoubtedly, possessed of extraordinary power to interrupt the progress of an intermittent, whether by any specific inherent febrifuge property, I will not affirm. It is decidedly stimulant, too much so to be applicable to the great majority of cases, or to be depended on alone. I am accustomed to use it in combination with the sulphate of quinine, which I prescribe throughout the apyrexia, at intervals, as I have stated; and just before the period of expected access, I add the piperine, giving one or perhaps two doses of the latter an hour and a half, and half an hour before the invasion. The dose of piperine which I employ is one grain, and from this quantity, in the combination just dwelt on, I have obtained the most gratifying and unequivocal results, having succeeded with it in the most obstinate and protracted cases.

No domestic remedy enjoys a higher local reputation than the vinous tincture of *sage*, made by pouring into a bottle, as full as it can hold of the leaves of fresh sage, good port wine, thus producing a saturated infusion, of which a wineglassful is a dose, taken thrice a day. Many obstinate and protracted cases in our low country have been promptly cured with it.

Narcotine—or rather the *muriate of narcotine*—one of the principles contained in the invaluable juice of the poppy, has been extolled by O'Shaughnessy and other East Indian physicians, as very serviceable in the treatment of intermittent fever. It is, doubtless, a good addition to our long list of remedies. In ordinary cases it is not an available substitute for the sulphate of quinine, which is vastly more efficient; but in many modifications of condition which offer objections to the better remedy, it will be found of use. Like quinine, too, it seems adapted to the management generally of paroxysmal and recurrent maladies.

Sulphur is a well-known and exceedingly valuable remedy for intermittent fever. It may be administered without hesitation safely and properly, in an extensive variety of cases, when the bark is contra-indicated. Sulphur has been used in the treatment of a long list of periodical maladies, and is considered an appropriate prescription in all anomalous, masked or disguised intermittents, headaches of regular recurrence, periodical pains in the eye, etc.

Dr. Grainger, of the British army, found sulphur, he tells us, the best cure for the intermittents of the pestilential island of Java. It is customary for the captains of American vessels, in those unhealthy ports, to give it freely and regularly to their men during their stay, as a preventive, and the practice is said to be successful.

It forms, in combination with cinchona, in powder, one of the most efficient preparations I have ever employed in the management of the more obstinate intermittent fevers, and is very extensively adapted to the modifications and irregular complications we sometimes meet with. I prescribe the proportion of about ʒss of cinchona to 10 or 12 grains of sulphur, repeated every third or fourth hour, taking care not to irritate or disturb the bowels with colic or diarrhœa.

There remain a host of minor articles, comparatively speaking, which the industry of physicians, and the observations of authors and of the common people, have brought into use. They may be arranged under the heads of bitters, astringents, and mineral tonics. Under the first we may mention the bark of willow, from which *salicine* has been extracted, a principle analogous to quinine, and though undeniably useful, yet by no means deserving of the confidence we place in that powerful drug. The dogwood bark has also yielded in small quantity, a similar extract, *cornine*, highly eulogized by those who have employed it. The infusion is also regarded as possessing some febrifuge value.

The common poplar was thought by Rush little inferior to cinchona, but has now fallen into disuse. Quassia, gentian, carduus, are also forgotten. Infusions of *raw coffee* and of *cotton seed* are reported to have been very efficient. Among astringents, our oaks, mahogany, pine, and alum, have all of them been found efficacious in particular instances. Indeed the list of remedies for intermittent seems endless. I will add here apiol, from parsley; holly leaves; fennel, zeopon; lilac leaves; lemon-juice, kumbanzo; apocynum cannabinum; chalk and vinegar; corn-meal, &c. &c. Burton mentions a case of quartan in an Arab sheik that had resisted all European physic, cured by an Egyptian applying the actual cautery to the crown of the head.

Of the mineral tonics, *arsenic*, notwithstanding the doubts of some authors, merits to be considered the principal. It is, however, one of the class of heroic remedies, and requires to be cautiously administered and attentively watched. We are often tempted to make use of it with children and indocile adults, on account of its inoffensiveness and ready susceptibilities of disguise; hence it forms a frequent ingredient in patent and secret medicines or compounds. It is best exhibited in combination with alkali, and in a liquid form, as in Fowler's solution, and in small dose, not more than from three to ten drops thrice a day. It seems to be singularly successful in the extirpation of the most chronic cases—obstinate habitual quartans. Like sulphur, it has been found adapted to the treatment of an extensive catalogue of diseases of a periodical or paroxysmal character. The morbid effects of arsenic when prescribed are an unpleasant sensation at the pit of the stomach, a pale swelling of the eyelids, face, and extremities. When these appear, it is prudent to intermit for some time the use of arsenical formulæ, although McCulloch affirms that no augmentation of the unpleasant symptoms just recounted is occasioned by perseverance in the same moderate doses, nor indeed any other consequences which need be dreaded.

The *arsenite of quinine*, as uniting the efficacy of our two best remedies, promises well, and should be tried in obstinate cases. If we distinguish between the power to prevent a coming paroxysm and that of doing away the liability to future or distant relapse, we shall find quinine immeasurably superior as fulfilling the first of these purposes, while arsenic is more beneficial by its permanent influence in removing the proclivity to a renewal of the attack.

The preparations of *iron* are in very general use, and are much esteemed. The carbonate is extensively employed by Elliotson, of London. It is supposed to be especially serviceable in anomalous cases, and in masked and disguised intermittents, among which neuralgia has lately been classed as a kindred affection, arising from the same cause, malaria. The *prussiate* is highly lauded by Eberle and others. It is convenient in the management of wayward children, as it is tasteless and inodorous. I do not regard it with any confidence, as I have been more than once disappointed by it.

The salts of *copper*, of *bismuth*, and of *zinc*, have each, in turn, received favorable notice from writers on the *materia medica*. I cannot consider any one of them as of much value in the treatment of intermittent fever. The *sulphate of zinc* is said to be widely employed in the fens of Lincolnshire in England. The dose is one or two grains, three times a day, in combination with capsicum, which indeed I conceive to be the more efficient of the two.

I must not omit to speak briefly, before I conclude, of a few articles which do not come under either of the above heads. *Charcoal* is highly recommended by Dr. Calvert, and is said to be much employed in Sicily. I have never trusted to it alone, but it forms a beneficial combination with cinchona, when the stomach and bowels are torpid, with foul tongue, sallow visage, fetid breath. *Animal gelatin* was first prescribed by the British physicians, in the form of common glue. We cannot wonder that as soon as chemistry had ascertained the absolute identity of the two, this nauseous formula was set aside, and the far more agreeable calves' foot jelly substituted for it. I have never made exclusive use of it, but have ordered it with evident advantage, as the principal diet, to patients laboring under chronic intermittent; whether from its medicinal virtues, or its alleged nutritious qualities, I cannot pronounce. The *spider's web* has received many encomiums from high authority. It would seem, from the reports, to be a narcotic—perhaps also a tonic and stimulant. I have no experience with it.

Notwithstanding the employment, however judicious and persevering, of the most valuable and efficient of the remedies for intermittent, notwithstanding all these efforts, the patient will still occasionally continue to suffer, if not as regularly as at first, yet from time to time, and perhaps at distant intervals, from the recurrence of paroxysms of his obstinate tormenter. When this degree of tenacity has been attained, nothing will remove the disease, short of an entire alteration of all his habits of life and modes of living. He must be advised to change his place of abode for a time, and abandon his accustomed avocations. Let him take a long journey, or what is still better, as affording a more impressive contrast in air and diet, etc., a sea voyage of considerable extent and duration.

REMITTENT FEVERS.

These have been defined to be fevers presenting at calculable intervals notable abatement or relief of the prominent and characteristic symptoms, yet in which there occurs no perfect or complete apyrexia. From continued fevers, properly so called, they are distinguished by the degree and regularity of these periodical remissions. The best example of this type of fever which can be instanced, is our ordinary autumnal endemic, generally denominated *bilious fever*, and on account of this striking trait in its history *bilious remittent*, a phrase first employed authoritatively by Rush, and now sanctioned by universal usage. Of all the diseases which are to claim our attention, I am disposed to consider this as among the most important—from its annual presence in so extensive a section of our southern country; from its numerous attacks or epidemic prevalence in so many localities; from its frequent violence, rapidity, and proportional mortality; and lastly, from the heavy responsibility incurred by the physician in the management of this common but formidable malady, over which he is expected to exercise, and indeed may acquire a special control, by the judicious and energetic application of the appropriate remedies.

BILIOUS REMITTENT belongs almost exclusively to the warm months of hot climates; it is the scourge of our summer and autumn. I will not deny the possibility of the occurrence of sporadic cases even in the winter seasons of southern latitudes, but within the limits of the United States they are very rare, and must depend upon peculiar predisposition and other unaccustomed contingencies. In our own immediate neighborhood attacks are sometimes met with as early as April and May, the number increasing with the advance of the season, until the cooler temperature of October checks its progress. It disappears when frost sets in.

The prefix which forms a part of its title, announces the fact universally observed and acknowledged, that from its invasion and throughout its progress, the condition and functions of the liver are deranged, and disturbed in notable manner and degree.

An attack of this disease constitutes what has been generally spoken of as the "seasoning" of strangers in hot malarious districts; having undergone which they are considered as "acclimated," and thereby better fitted to endure the influences of our peculiar locality and atmosphere.

The alleged predisposition of the stranger is not well understood. It is supposed to be connected with, if not referable to, a robust, plethoric, phlogistic diathesis or habit of body. It is said to be most marked, in the sanguineous temperament, as seen in the Briton, the German, and the man of New England. In proportion to the harsh roughness and danger of this "acclimation" is the importance of the rational prophylaxis.

These views are mingled with and founded upon an obvious error. Acclimation to malaria for the white race is impossible; the only acclimating fever is yellow fever—the true stranger's fever.

But the error has not been without its uses. The new comer may, by the warnings given him, evade any grave or abrupt exposure to exciting causes, and thus escape an attack or greatly diminish its violence.

The recently arrived emigrant or visitor should live very temperately, but not too low or abstemiously. While he shuns all modes of special excitement, moral or physical, we must not advise too sudden a change of habits long familiar to him, unless in themselves vicious and injurious, or in some way rendered particularly unsuited to his new situation. The non-naturals, as they are absurdly termed, must be attended to—free ventilation, nourishing, pure aliment, exercise short of fatigue, tranquillity, and sufficient sleep; great personal cleanliness must be observed, and the bowels kept in a regular state.

I cannot denounce too strongly the measures recommended by some, of active purging at intervals of low diet, of occasional bloodletting, of confinement within doors, and last and worst of all, of a mercurial salivation. Instead of being in any degree preventive of fever, all these rather tend to bring the system into that irritable condition so generally associated with weak and low action, and depressed tone or vital power, which renders it more liable to be impressed by that class of causes which we style exciting and occasional. Experience, indeed, the surest and most infallible test, has not only proved their absolute inefficiency for good purposes, but has shown clearly enough their evil influences.

Causes.—Of these, the most universal, prominent, and certain, is the miasm from low grounds, stagnant pools, and swampy meadows, designated and discussed under the generic titles of malaria and marsh miasma; nay, this is probably the exclusive source of our autumnal remittent. Whether the same type of febrile diseases can be brought into existence by any other agents is at least extremely doubtful; for we must not confound the subject of our present discussion with any of the other forms of fever; continued, inflammatory, ephemeral, ardent, or by whatever names they may be known. Its analogies in course and history with malarious intermittents are, as we shall hereafter see, very close; from all continued fevers it is widely separate. Nor is there any difficulty in accounting for its miasmatic origin in early spring. The decaying and half-decomposed vegetable matters, leaves of trees and leaves of flowers, and stems of shrubs and plants produced during the preceding summer, and dying and withering in the intervening winter, are ready to receive, and are promptly acted upon, by the influence of the vernal sun of April and of May.

There are, however, many contingencies which forcibly aid the paramount atmospheric cause of which we have been speaking, and are classed as exciting or occasional. Exposure to the heat of the sun by day, to the damp and chilling night dews, to any sudden alternations of temperature, as by getting wet and cool in a summer shower, fatigue and exhaustion, whether from exertion of the body or the mind, violent emotion or gusts of passion, and excesses of all kind should be enumerated here. It is, however, to the specific impression upon the system made by the aerial poison, formerly treated of in detail—malaria—that we must ascribe all the peculiar and characteristic conditions of type, and progress, and course, which distinguish bilious remittent from all other fevers, and constitute it the endemic scourge of certain well-known localities, in which it is not unfrequently aroused into epidemic and pestilential sway.

History.—It is remarked by Robert Jackson, in his excellent treatise of this fever, that an indescribable uneasiness of the stomach precedes uniformly all its other symptoms. This is accompanied or soon followed by a feeling of languor and weariness. There is sometimes chilliness, which may perhaps increase into rigor or shivering, but is never, or rarely, so marked or violent as the ague of an intermittent. The skin soon becomes hot, and dry, and constricted; headache is complained of early in a large proportion of cases, with a sense of fulness, heat, throbbing, vertigo, and occasionally confusion of ideas; the face is flushed and turgid, the eyes red and suffused, the expression of countenance anxious and impatient; there is pain in the back and limbs—the calves of the legs especially—with muscular debility and prostration; hence the recumbent posture is sought and persisted in; respiration is hurried and uneven; there is much thirst; the sufferer is restless, tossing heavily from side to side; the circulation meanwhile increases in rapidity and force, with irregular determinations to different organs; the pulse is full, hard, and bounding, with a perceptible abruptness, jerk, or quickness: it is frequent, beating from ninety to one hundred and twenty, or more, in the minute; the tongue in a few hours becomes coated with a whitish secretion, progressively thickening into a dense crust or fur, tinged of a brownish or yellowish hue, under which its sides and edges are seen of a preternatural fiery red; it is often somewhat swollen, and of a sodden look the indentations of the lower teeth being distinctly impressed upon its nargin, and shown when protruded. The gastric uneasiness above spoken of augments steadily; there is oppression, nausea, retching, and vomiting. The ordinary contents of the stomach are first thrown up; the ingesta present, water, mucus, then bile of healthy character, or variously vitiated, greenish or blue, dark brown, etc. There is some relief after every such vomiting, but this relief is transient, and the organ continues disturbed, oppressed, uneasy, and irritable. The bowels are generally constipated, and in the majority of instances moved with some difficulty. The stools procured by the action of purgatives vary much in the progress of the cases. They differ in hue and consistence, and in all their qualities are indeed so multiform as to bid defiance to every attempt at detailed description. They may show, according to the varying condition of the secretions generally, and of that of the liver in particular, either a deficient flow of bile, the mucus, serum, etc., evacuated, being whitish or colorless, or mixed merely with blood or sanies, or an increased discharge and morbid state of this fluid; they are thin, dark brown, greenish, and even black, often exceedingly acrid and offensive. The symptoms above described, of prominent febrile excitement, continue from nine to eighteen hours, after which they undergo a partial and gradual abatement. The headache is less intense; the stomach less agitated and irritable; the thirst less distressing; the general uneasiness and restlessness diminished; the patient sleeps. It is gratifying to find a free perspiration establish itself over the whole surface during a long and quiet slumber; in *remissions* less marked the moisture will be but slight, and extend perhaps only over the forehead and face, soon drying away.

We must not omit to observe here, the striking analogy of bilious remittent in its course and progress, with the periods of the double tertian formerly described.

It is familiarly known even to nurses and the common people, that the exacerbations of alternate days offer a very notable correspondence in time of invasion, mode of access, degree of violence, and length of duration. They preserve throughout, in many cases, too, the particular determinations with which they are connected or complicated: thus, the head will be most affected on the first, third, and fifth days, and the stomach or bowels on the second, fourth, and so on.

We meet occasionally with examples of equally obvious analogy to the triple tertian. There will occur, on alternate days, in these, two definite exacerbations, with but a slight and transient remission between them. This I suppose to constitute at least one of the forms of herosthesis of the ancient writers, or accumulation of paroxysm upon paroxysm, as alluded to by Robert Jackson; on the intervening days there may be but a single exacerbation, with a longer, better, and less partial remission. Yet these cases are always severe and troublesome. The duration of the remission will, of course, vary much, being inversely proportioned to the violence and obstinacy of the attack. The exacerbation encroaches again earlier or later in the forenoon, with a renewal or exasperation of the symptoms detailed, and if the disease is progressive or unchecked, with added intensity. The vomiting is more frequent and distressing, developing a painful heat and soreness of the epigastrium; pressure with the hand upon the scrobiculis cordis cannot be borne; the headache is oppressive and intolerable; the eyes will not endure the light, and the ear is pained by noises or even ordinary sounds; the restlessness and jactitation prevent sleep, or render the slumbers taken, short and unrefreshing. There is great anxiety, fretfulness, despondency; the pulse loses some of its fulness, but is still tense, frequent, and abrupt. The tongue assumes a dark hue, and the thick brown fur is even blackish along the central line; it is often dry and chapped, or cracked. The bowels, sometimes obstinately costive, refuse to yield to our laxative formulæ; at others, tormina and tenesmus annoy the patient with stools frequent, thin, and offensive, or even acrimonious; respiration becomes hurried and embarrassed, and interrupted with heavy sighs. There is great muscular debility.

From such concussions as these, the constitution must suffer inevitable derangement and lesion. After a few exacerbations, in number inversely proportioned to their violence or to the resiliency of the system, we begin to see the evidences, on the one hand, of exhaustion and prostration of the vital powers, or on the other of local disorganizations, foreshown, usually, by the observed determinations to particular viscera. The pulse sinks, is small and feeble; subsultus tendinum, hiccup, tympanitis, delirium, present themselves; the functions are all more and more impeded in their play, and death ensues after a period varying from seven to thirteen days. The vulgar calculation which rates the average duration of the most ordinary form of bilious remittent at about nine days, is not far from the truth.

It is not uncommon, however, especially among the most perfectly acclimated adult natives resident in malarious localities, and strangers long familiarized to our atmosphere, to find bilious remittent lengthening itself out to a tedious protraction; the patient sinking, after the tenth or twelfth day, into a low state of fever resembling the less severe grades of typhus, and hence, obtaining among us the designation of the *typhoid* stage of bilious fever.

Here, the well-marked lines which separate the periods of exacerbation and remission, are almost effaced; the characteristic periodicity almost obliterated; the fever degenerates nearly into the continued type, and the patient, in the language of the older practitioners, "wades through" the attack with no definitely regular changes observable from time to time, until, by the success or failure of our efforts in his behalf, he recovers or is lost. The pulse is small or chorded, the tongue throws off its fur, and is smooth, red, and dry, or smeared over like the teeth and lips, with foul sordes; the stomach loses its irritability, and the vomitings cease; the stools are dark or even black; meteorism occasionally shows itself; there is muttering delirium or disposition to heavy stupor and coma; the countenance is dull and inexpressive; muscular languor and great debility ensue, with nervous tremors on motion, and perpetual *subsultus tendinum*. This condition is almost indefinite in its duration. I have known cases protracted in three instances to thirty, thirty-five and fifty days, though the average would scarcely reach beyond fifteen or twenty.

The general *prognosis*, in bilious remittent, differs somewhat in different localities, and in successive years in the same locality. From the authentic records of its mortality, it is certain that the proportional success of the modes of treatment in the south and southwest must be greater, or that the violence and fatal tendency shown by the disease must be less than in other malarious regions.

From all that I can learn on the subject, I am not disposed to rate the proportion of deaths from this fever at more than one in 40 or 50; it may exceed that amount, yet not greatly, in the country practice throughout the southern States.

In 1827, I attended and made a record on my case book of 274 cases of fever.
In 1835, " " " " " 222

Of these, in 1827, there were of bilious remittent, 188
" " 1835, " " " 123
311

In each year there were three deaths, six in all. Making one death in about fifty cases, taken promiscuously.

Dr. Boling gives, in the fifth vol. of the *Trans. Am. Assoc.*, a very interesting tabular statement of 1036 cases of fever, of which he lost but 19—about one death in 54.

I must be understood, however, in the above statement, to speak of the ordinary form of inflammatory remittent. The congestive variety which has sprung up of late years, into such a gloomy notoriety, is unquestionably far more dangerous and fatal, and I am not prepared to pronounce upon its ratio of mortality.

The individual prognosis will depend, of course, upon a great variety of circumstances. The form, which the attack may assume; the condition of constitution in which the patient may be assailed, whether permanent or transient; the mode and degree of exposure to the cause, and the immediate history of the invasion, and of the contingencies which precede or accompany it; all these considerations will have their influence.

A recently arrived stranger, an intemperate man, one of active habits of fatiguing exercise or hard labor, having lately visited and slept in our malarious low country, or having committed an unaccustomed debauch, will, it is evident, be in peculiar danger from the very first, and will undergo a very severe and rude attack. Contrast the risks of such a case with those of a female patient of sedentary habits and delicate frame, protected as far as possible from exposure, and unacquainted with any form of excess.

In the progress of an attack, the favorable symptoms are, the comparative shortness of the exacerbation; the definite relief and long duration of the remission; the postponement of the exacerbation beyond its expected period; the comparatively moderate return of the disorders of different parts which attend upon the exacerbations; the diffusion and abundance of the sweat which flows during the remission; the readiness with which the bowels are acted on and controlled; the subsidence or diminution of special determination to vital organs; the tongue becoming cleaner and less red; the pulse slower and softer. The tendency to convalescence, is often strongly marked by the enhancement of the remission into an apyrexia, and the conversion of the case into the intermittent type.

On the other hand, an imperfect, ill-defined remission; the quick or anticipating arrival of the exacerbation; the special frequency of the pulse, a symptom always menacing; embarrassment of respiration; painful and violent determination to any important organ; dark color or blackness of the stools; great muscular and general debility, as shown by disposition to fainting, flagging pulse, subsultus tendinum, relaxation of sphincters, and involuntary discharge of feces and urine; a low, muttering delirium; picking at the bedclothes, and catching at imaginary objects in the air; a bronzed hue of the surface, produced, probably, by a sort of capillary paralysis, rendering the smaller circulation slow, and stagnant; tympanitis, and hiccup; these are all signs of increasing danger and difficulty. The hippocratic countenance, and the exhalation of a cadaverous odor, are often the immediate precursors of dissolution.

The convalescence from bilious remittent is attended, especially in our autumnal months, with a rather tenacious proclivity to relapse or recurrence of the disease; in this, as in so many other circumstances, exhibiting its analogy with its connate intermittents. This is more to be apprehended when the digestive organs of the patient remain weak or oppressed, with a tongue furred or red, and a bitter taste in the mouth. These relapses are more apt to occur at the septenary periods—the seventh or fourteenth day, than at any others, and lay the foundation, occasionally, among various ill consequences, of the most tenacious, indomitable and protracted intermittents.

The diagnosis of the disease which we are discussing, has never appeared to me to be attended with any difficulty, theoretical or practical. The characteristic traits of yellow fever, with which some writers have confounded it, on the one hand, and those of typhus on the other, which it may be said to approach in its congestive shades, seem sufficiently well marked to prevent all misapprehension.

It must be acknowledged that there are instances in which congestion, an intense congestion (of which capillary paralysis is a large part) being the prominent feature, bilious remittent, yellow fever, typhus and typhoid fevers, catarrhal affections, nay, even malignant cholera itself, would hardly be discernible each from any other. But it is not consistent with an enlightened pathology to fix the attention exclusively upon any of these anomalies, and from them to draw the history of types in disease. The ordinary current of events, the regularity and degree of relief at certain calculable intervals, and the equally certain and calculable return of the exacerbations, constitute a history, so readily recognizable, as to admit of little chance of mistake in any observer of average intelligence.

The *effects* of the attacks of bilious remittent are fairly divisible into those which are discernible during the progress of the disease, and in convalescence, and such as are prominently displayed in post mortem examinations. Of the first of these, I have already spoken; the second are equally interesting and impressive, perhaps, and nearly as characteristic as we shall find the third.

After a severe attack, the hair sometimes falls off, leaving the scalp bald; the muscular strength is often impaired for an indefinite period; the memory is occasionally obscured and the mental faculties generally dimmed or enfeebled. Where there is predisposition to pulmonary affections, the lungs are apt to suffer seriously, probably from both congestion and inflammation, and a tenacious cough long harasses the invalid. The tone of the stomach is not unfrequently lost, and an annoying train of, so styled, dyspeptic affections commences, among which costiveness and alvine irregularities are usually the most troublesome. Upon the liver and spleen, however, falls, doubtless, the principal and most direct pressure of the suit of morbid actions in which this type of fever essentially consists. The liver is the seat rather of congestion, I am disposed to think, than of inflammation. Jaundice is hence one of the most frequent consequences of bilious remittent; I have repeatedly seen it assail the patient before he had recovered sufficiently to leave his bed. This connection was noticed generally in the summer and autumn of 1824; very few patients recovering from fever in that year without becoming icteric. Nor is it rare to meet with hepatic enlargement and induration, attended by a long succession of sufferings from visceral obstructions and mechanical impediments to the performance of the abdominal functions, and to the transmission of the abdominal circulation. Hence ascites and anasarca, and hence diarrhœa and dysenteries called hepatic, and occasionally melæna and true intestinal hemorrhages. The spleen suffers from remittents of malarious origin as from their kindred intermittents, though not by any means so uniformly, sometimes undergoing a permanent and inconvenient increase of size or hypertrophy.

The *necrotomy* of bilious remittent has been less definitely portrayed than one would expect in reference to a disease so frequent and well known. We may account for this in part, by stating that death in a great majority of cases does not occur from any special lesion or disorganization. The traces left by the fatal malady are diffused, and assume a prominence in various parts of the body relative to the constitutional predispositions of the subject, or the epidemical modification prevailing, rather than characteristically defined or uniform.

There is usually considerable engorgement of the brain and its membranes. The lungs do not often show any striking changes. The mucous membrane of the stomach and intestines is highly injected in severe and short attacks. In more protracted cases follicular ulceration may be found throughout the whole extent of the bowels. The same tissue is sometimes found thickened and softened as well as reddened. There is also an evident engorgement of the vessels of both liver and spleen, which organs are usually enlarged and heavier than natural. They are sometimes indurated, but at others softened and brittle. Dr. Stewardson, of Philadelphia, describes a striking and penge of color in the liver, which he regards as indicative of al anatomical characteristic" of this disease. "The natural wn tint is entirely extinct or only faintly to be traced, and iscus assumes a hue of mixed gray and olive." Its substance, ays, is generally somewhat softened. Similar observations are led by Prof. Swett and others; but the change is not uniform.

atment.—In the management of fever generally, and certainly in nstance at present under consideration, the attention of the physi- should be from the first directed to the local determinations, so ptly developed and so urgently harassing in a majority of cases, n a large proportion so full of real dangers. There is vehement ulse of blood toward the brain and its membranes, whether irrita- , congestive, or inflammatory, as shown by flushed and turgid e, red eyes, headache, delirium, e .; upon the medulla spinalis, violent pains in the neck and d wn the back, and sympathetic ning of the muscles of the limbs; to he stomach and other abdomi- viscera, as denoted by gastric ression, vomiting, fulness, ten- ness, heat, and the like. To r e these local determinations, ost universally accompanied with u equivocal tokens of great ex- ment, of an increased and morbid ction in the whole circulatory em, constitutes, doubtless, our ea st and most prominent indica- . How are we to reduce morbid excitement, diminish irritation, resolve congestion, prevent inflammation with its train of destructive sequences? How are these ends to be best accomplished, what ns are those which shall combine the most immediate efficiency the greatest ultimate safety, and the most entire well being of our patient?

The indications for the use of the lancet are much more likely to present themselves in a recent emigrant or visitor from some colder and more bracing climate than our own. Such a stranger brings with him hither the obvious marks of what is familiarly and not inaptly styled "the phlogistic diathesis." His ruddy visage, full muscular habit, and bright complexion, well known tokens of the sanguineous temperament, show readier tendencies to ordinary inflammatory excitement, and his case will demand a treatment diligently adapted to his particular state of constitution. Early in the attack he will be found with a throbbing temple; a pulse hard, full, abrupt; a red eye; a turgid visage; an anxious expression of countenance; violent pain in the head and along the spine; a hot, dry skin, and an irritated stomach.

In such an example, not so often met with now as formerly, I would not hesitate to open a vein and take away at once a sufficient amount of blood to subdue the violence of vascular action; nor measure the number of ounces nor stop the flow until that purpose be obtained. The cases are rare in which it will be found beneficial to repeat it, and still rarer those in which the delay of even a few hours does not render it at least comparatively inappropriate and ineffectual, or improper.

Again, if the patient, whether a stranger or a native, should exhibit at the invasion of the disease, an inordinate or peculiarly vehement determination to the head or stomach; if he be mad or furiously delirious or comatose with a full pulse and hot skin; or if he complain *at this early stage* of excessive tenderness at the epigastrium, with inability to bear pressure, and pain and heat increased on vomiting, we must bleed him—and bleed him until we procure relief from these urgent symptoms, or until the pulse by its yielding gives us warning to stop. Perhaps, indeed, it will be best to abstract blood in all cases in which very special intensity of pain or other definite proof of dangerous determination to any vital organ constitutes a prominent symptom at the early stage or very commencement of the febrile paroxysm, unless at the same time it be expressly contra-indicated by the state of the pulse or other contingency. So far as my own experience warrants, these are the only circumstances which justify the use of the lancet in our endemial remittents. I say *justify*, for I hold that venesection should never be regarded as a matter of choice, but of necessity. In ordinary cases occurring among our native citizens and old residents, where the force of the attack is not specially aimed at any single important organ, but diffused over the system generally—"the mixed cases" of English writers, bloodletting is not only unadapted, but improper and injurious—its immediate effect is sometimes irremediable prostration. A protracted illness, a slow and tedious convalescence, a permanent proclivity to visceral obstructions and hydropic effusions, are some of the ill consequences which follow its injudicious employment.

The topical abstraction of blood in fever, eulogized on the one hand, in most exaggerated terms for its remedial efficacy, has, on the other, been sometimes spoken of with undeserved contempt. As a means of relief from local determinations in the first stages of common inflammatory attacks, there can be no reasonable objection to it. Leeches are preferred by the majority, but cupping answers, I think, a better purpose. Both the cups and leeches should be placed as nearly over the organ assailed as may be convenient; to the temples or the back of the neck, or on the course of the spine to relieve the brain or vertebral cord; to the epigastrium or lower abdominal surface if the viscera of this cavity be affected, and to the side or chest for pulmonic derangement. I do not coincide in opinion with those who attribute the beneficial effects of these operations, directly to the depletion of the small or capillary vessels from which the blood is taken away. I ascribe the advantage we gain from them principally at least, and in the majority of instances, to the *revulsion* they produce. It is common, for example, to speak of the leeching of the epigastrium as an immediate means of detracting blood from the vessels of an inflamed stomach, but here there is no vascular connection with the surface except through the general circulation.

If there be any fatigue or inconvenience occasioned by the application of the cups or leeches, or any objection to the necessary exposure, it is my habit to substitute for them a warm mustard cataplasm or other fomentation, with which, unless I have grossly deceived myself, I have obtained results little less impressive and satisfactory. Nor can anything be more evident than the preference due to the latter modes of derivation in the advanced stages, and in cases of threatening debility, when the loss of only a few ounces of blood may sink the patient irretrievably.

The cold bath, one of the most ancient and universal remedies for fever, demands our early attention, as specially indicated in the variety of it under discussion. The temperature of the season, the very nature of the attack, the symptoms present, the condition of the patient, are all such as to prepare us to expect from its employment the happiest results. Accordingly I am disposed to rank it among the most efficient of our febrifuge measures here, far above the lancet both in the extent of its adaptation and in its degree of specific utility. All that we can hope or anticipate from bloodletting may be obtained in a majority of cases by the use of the bath, while the latter possesses this striking and obvious advantage, that we can repeat it as often as the symptoms are renewed that require it. Nor can I help expressing my surprise at the very limited resort of my professional brethren to it, when I consider how instinctively we desire it as a relief from the burning heat that oppresses us, and how certain and immediate a means it is of affording this relief.

Of the three modes of employing it, affusion, namely, immersion, and ablution, the first is the most impressive and efficacious, the last the least liable to objection or risk in doubtful cases. The particular indications which demand the resort to it unhesitatingly, are found in the youth and general vigor of the patient, and the heat and dryness of the surface. The local determination, which it controls most promptly, is that to the brain, shown by headache, flushed face, red eye, delirium, etc., with a full, hard, bounding pulse. Seat him in a convenient receptacle, and pour over his head and naked body from some elevation a large stream of cold water; continue this until he is pale, or his pulse loses its fulness, or his skin becomes corrugated, and he shivers. On being dried and replaced in bed, a genial sense of comfort and refreshment will attest the benefits derived from the process, which, as I said above, may be repeated whenever the symptoms are renewed which it is so well adapted to remove.

If the shock of this shower bath or cataract be too great, immersion, which many prefer, may be substituted. Few shrink from this, and almost every one will evince the high gratification and enjoyment derived from it. One of the pleasantest effects following the bath, is the complete relaxation of the surface, which it so often brings on, attended with a copious and salutary sweat. The patient is to be covered agreeably to his sense of comfort; and though I would not place him in a current or draught of air, I would have his chamber fully and freely ventilated. Some have strangely enough imagined it to be necessary that evacuations of some kind should be premised to the application of the cold bath, but this is a worse than superfluous caution. It does positive harm by postponing the remedy until the time of its most special adaptation and greatest utility is past—the earliest and forming stage of the febrile attack. Yet there will be frequent occasion to advise its repetition, at intervals, throughout the whole progress of the disease; and even when the patient can no longer bear either affusion or immersion, he will often be relieved and gratified, by washing and sponging him, especially over the hands, arms, breast, feet, and legs. In the very latest stages of our worst fevers, ablution in this way, with ardent spirits, is found singularly refreshing.

The affusion of cold water locally upon the head, in a stream of some height, the spout bath, is of inestimable advantage in cases where the cerebral determination is inordinately violent, dangerous, or tenacious, and will bear to be repeated far oftener than it would be proper to take the patient out of bed for the administration of the general bath. Support him in a leaning posture over the bedside, and dash the current from a pitcher over the vertex for some minutes, and from some elevation above him. Many who dislike all the other modes of using cold water, entreat for this operation as the most soothing of possible indulgences; nor have I yet met with any ill consequences from allowing its most unlimited frequency of repetition. The cold bath, in its several modes of general application, is prohibited, when the patient is of feeble habit of body, much advanced in age, much exhausted or enfeebled at the time; when the pulse is weak, or the skin cool, or covered with moisture; when the lungs are oppressed or inflamed, and when diarrhœa is present. Its repetition is forbidden when it has occasioned a protracted chill or rigor, or the patient has continued to feel cold or uncomfortable from it.

It has been with many physicians a practice so common, as to have grown, indeed, into a general rule, to commence the treatment of bilious fever with an emetic; in the domestic management of numerous families, and on many plantations in the South, it is a uniform custom. The stomach, as was formerly stated, is assailed early, feels oppressed and irritated, and vomiting comes on spontaneously, or is eagerly desired by the patient. A degree of transient relief is thus obtained, the organ having been loaded, perhaps, by the presence of a recent undigested meal, or, it may be, a collection of foul crudities and morbid secretions. The emetic is clearly indicated under these contingencies, when they can be ascertained; as when immediately upon the invasion of the fever, there ensues retching with imperfectly successful efforts, only bringing up mouthfuls of offensive ingesta or porraceous, acrid, and bilious matters. The tartarized antimony is usually preferred, as quick and efficient; its operation on the system is more diffused and extended, and productive of more general relaxation and more determination to the surface, than that of any other emetic. Like all other preparations of antimony, it is supposed to possess certain specific febrifuge properties; it should, however, be administered with caution. It acts occasionally with great violence, and produces protracted irritation. Idiosyncrasies present themselves, in which it excites cramps and dangerous spasm on the one hand, or serious prostration on the other. Ipecacuanha is a very safe and useful substitute, or if any objection present itself to these, the sulph. zinci may be prescribed. For my own part, I do not exhibit any emetic in fever, as a matter of choice. In the circumstances above delineated, it may be the least of two evils, but it has appeared to me to have a tendency rather to increase than to diminish the gastric disorder, which belongs he history of the disease. When it can be dispensed with, then I efer to abstain from it. I am especially anxious to avoid it when the uneasiness at the stomach is attended with a sense of heat and weight, and when pressure upon the epigastrium is complained of; these are tokens that the irritation is disposed to assume an inflammatory character, likely to be aggravated by the impression of the emetic on the ucous surface, as well as by the vehement muscular action in vomiting.

Cathartics are universally employed in bilious remittent; their efficacy is twofold. From the very extensive mucous intestinal membrane, we procure a large effusion of fluids, thus depleting promptly, essively, and efficiently. To this excitable tissue we determine greater or less vehemence, according to the article selected; and this way, obtain a decided, and very beneficial revulsion from gans more liable to be injured by febrile congestions and concus-ns. Besides these effects, and perhaps, as their most valuable influ-ce, we must regard purgatives as truly depurative, as their name ports. In fever, the secretory and excretory vessels are inactive, and fail to eliminate effete and injurious matters from the system. This is done effectually by the substituted excretion, artificially excited from the bowels.

Among the numerous drugs and formulæ to be found in the materia medica, of which almost every physician has his favorite, it is my habit to select the mildest, which is, at the same time, sufficiently active to effect the purposes above indicated. I abstain from such as are offensive to the stomach, or occasion griping, or give rise to notable uneasiness, burning, etc., in the abdomen. Calomel is the most valuable of our purgatives. It remains well on the unquiet stomach, is not apt to be rejected, and operates as effectually and easily as any other, in the majority of cases; yet it is rather slow, and may require to be somewhat hastened in its action. This is readily done by the administration of alternate doses of the Epsom salt (sulph. magnes.), one of the most useful of all cathartics, very widely adapted, and especially safe; or we may employ, in the same way, a combination of the resinous with the saline purgative, mingling a proper amount of pulv. rhæi with the solution of sulph. magnesiæ; to which, if a drop or two of some aromatic oil be added, we have a neat, serviceable, and generally, not unacceptable formula.

Castor oil, an inestimable domestic medicine, though not often available among adults, who dislike and reject it, will be very frequently found our best choice for our young patients. Whatever cathartic be administered, we should take care that the dose given is not so large as to oppress a delicate stomach, nor so often repeated, as to offend in that respect; the interval of an hour and a half or two hours is usually proper to be allowed. If one formula be rejected, we should change it for another and another, and we shall rarely fail, by judicious combinations and modifications, to find some means of attaining our purposes, with, at least, comparative ease and comfort. We may further promote the effect of the purgatives taken by the mouth, with the exhibition of laxative enemata; a measure which the false delicacy of our country has caused to be too much neglected.

Diaphoretics were formerly much more relied on than they are now, in the treatment of fever; yet, although they do not deserve to be trusted to exclusively in almost any case, it is impossible to doubt their general utility and importance. They are divided into two classes—the sedative and stimulating, and I need hardly remark, that their adaptation varies, relatively to the stage of the attack or the modification presented. In the early periods of the ordinary form of bilious remittent, the former alone are applicable, and it is among us a very common habit to combine them with our first cathartics; a practice which, although liable to some plausible objections, is yet found to answer extremely well in the majority of instances.

The antimonials hold here the highest rank. The three most familiar preparations are the pulv. antimonialis, James's powder, and the tart. antimony. The first is supposed by many to be identical with the celebrated patent febrifuge invented by James, and still prepared by his successors from a secret recipe. They are all highly valuable and well deserving our confidence. I make it a rule, however, to exhibit them in quantities too small to nauseate, and to desist from their employment whenever they are offensive or distressing to the patient. Some of the salts of potass are in great repute as sudorific and diuretic; the nitrate, the acetate, and the citrate may all be thus employed.

We can scarcely credit, in modern times, the cruel pertinacity with which the natural and necessary refreshment of cool beverages was denied, by the prejudices of past generations, to sufferers in fever. We now regard them as salutary, and allow ice itself, and iced liquids freely. I know of no limit, but the capacity of the stomach to bear them without irritation and uneasiness.

During the remission, which the management above detailed as requisite throughout the course and progress of the exacerbation is intended to hasten, to render more perfect, and to prolong, we must not allow our attention to our patient to slacken. Nay, we are now called upon, perhaps, for a still nicer, and more assiduous exertion of diligence and skill, as the improved circumstances often afford a better opportunity of useful interference. If it be marked with definite abatement of febrile derangement, we must not omit the employment of the sulphate of quinine in proper and efficient dose. It may be trusted to alone or combined with such other remedies as are indicated. Purgatives, if formerly rejected, will now probably remain on the stomach and act kindly. Diaphoretics, too, are less apt to nauseate, and may be exhibited in fuller doses, and procure a more free and diffused sweating. It is thus that we may hope to diminish the violence of the returning exacerbation, if we cannot altogether prevent it. To subtract as much as possible from its intensity, we must time the administration of our prescriptions, so as to bring our patient most completely under their effect, freely operated on by the purgative, fully sweated by the sudorific, just at the period of its expected invasion. Let his windows then be darkened, his apartment kept fresh and cool by ventilation, and, if necessary, by evaporation, sprinkling his floor with water, vinegar, or ardent spirits, and prevent any excitement by noise or by conversation with him. It is always advisable, further, to meet a coming exacerbation with revulsives so applied as to counteract or diminish the local determinations to important organs. The head may be wrapped in towels wet with iced water, while the feet are plunged in the hot foot-bath. Cataplasms or mustard poultices may be laid to the epigastrium or abdomen, until they redden the vessels of the skin, and relieve the internal tissues. As the case progresses, our treatment must be modified to suit the varying contingencies of the successive exacerbations. Sponging the arms and breast must be substituted for affusion and immersion. Cathartics must be abandoned, and the bowels kept open either by enemata or occasional and distant laxatives. Diaphoretics of more cordial and stimulating character may be exhibited. The infusion of serpentaria is much used; the acet. ammon. (spts. mindereri) with nitrous æther. I employ very often, and with peculiar confidence, a solution of the carb. potassæ, with small doses of the tinct. op. camph. as in this formula: ℞.—Carb. potass. ℈j; aquæ pur. ℥viij; tinct. op. camph. ʒj. M. S. One or two tablespoonfuls every two hours.

This combination exhibits a remarkable tranquillizing effect; quieting the disturbed stomach, and relaxing the constricted surface. It is at this juncture that benefit attends the use of the steam or vapor bath, which we apply by Jennings' apparatus, or by pouring water or vinegar on a hot brick under the bedclothes raised upon the arch of two or three hoops; these means all tend to give a centrifugal determination to the fluids, and create an abundant effusion from the cutaneous vessels.

The drinks of the patient may be made, as is supposed, mildly nutritious, by the addition of thin mucilaginous or farinaceous infusions, such as strained gruel of Indian corn, arrowroot, etc.

Epispastics may now be had recourse to. There has been much and angry dispute concerning the use and abuse of vesicatories in fever; but it seems to me to resolve itself fairly into a mere question of time and circumstance. While the sensorial energies are active, and the vascular excitement high, the pain and inflammation of a blister will probably add more to the general irritation of the disorder than will be compensated for by its revulsive impression. But when the case is protracted beyond a certain point, the former effects do not follow, or are of less relative importance, nay, the exciting, as well as the revulsive influence of the epispastic becomes desirable. By the selection of proper periods, we may make this class of remedies, however, entirely safe, and far more valuable than if this be unattended to. As revulsives, we must apply them in the remission and in the vicinity of the organs we desire to relieve; to the epigastrium or side for the benefit of the stomach or liver; to the back of the neck or between the shoulders if the head be threatened; along the spine or on the sacrum to relieve congestion or irritation of the vertebral cord. If, on the other hand, their stimulant or excitant effect be wished for, this is most needed as the febrile paroxysm subsides, and we should put them n during its continuance; or it may be requisite to keep up their irritative action, which is done by applying one every fourth or sixth hour to the limbs, the ankle, instep, leg, thigh, arm, forearm, and wrist. Under judicious management, we derive much benefit from vesicatories. They relieve determinations to important organs; by hus subduing internal pain, they occasionally procure rest and sleep; hey rouse the dormant powers of the system, excite into renewed vigor the circulation, and improve the pulse, and spur on the fatigued and wavering functions. Even their most painful consequence, which, therefore, I have not attempted to evade, I mean strangury, is often found useful as revulsive, counter-irritant, and stimulating.

In the advanced stages of fever, it may become necessary to support the declining strength of the patient by an energetic and persevering administration of diffusible stimulants. This practice has been the topic of severe censure from some writers on medicine, who seem to have been guided in their notions more by speculation than experience. Death from fever may take place in one of two modes; there may either be the lesion of some important viscus which shall incapacitate it for the performance of its functions absolutely and permanently, or there may be, from the violence and protraction of morbid excitement, such a degree of exhaustion and consequent debility, that the patient may sink and die, no such lesion having taken place. In the first instance, it is evident that stimulants can be of no ultimate avail, although we may protract life for a short period by their exhibition; nay, in such cases they may be positively injurious, increasing pain and hastening on the final catastrophe. But, in the second example, of transient depression merely of the vital powers, such as we often meet with in bilious remittent, it is not only defensible, but proper and necessary, to rouse, by these means, the depressed energies of the sick man, and fan again into a flame the sinking spark of vitality. I acknowledge the occasional nicety of the measure; the difficulty, often extremely embarrassing, of finding such stimulants as shall avail to excite the general system, the circulatory, muscular and sensorial functions, without increasing such local irritations and determinations, congestive and inflammatory, as may have affected the organs and tissues. Nothing, however, can be plainer than the demand for immediate support to the failing powers of life: subsequent ill consequences must be met as we may. Great anxiety is felt under these circumstances by many physicians as to the proper selection of stimulants, and much ingenuity and observation have been expended in the hope of avoiding here the Scylla and Charybdis which on either hand threaten to wreck our hopes. The spiritus terebinth. is preferred by some, under the belief that there is something specific in its mode of operation, which makes it safe even in cases of obvious inflammation, as we know it to be useful in metritis and peritonitis. Capsicum, too, is thought to possess an analogous peculiarity of action, shown in its adaptation in sore throats, scarlatina, etc.

But I avow, for my own part, that when I see the respiration hurried and impeded by debility, the pulse flagging, the skin covered with a cold and clammy exudation, I do not entertain any very fastidious scruples as to the ulterior effects of my stimulants. I am only afraid of finding them inefficient to act upon the little remains of excitability present. The objections which have been so obstinately urged against them, originated surely in the logical essays of the closet, not in sick-rooms or in hospitals, not at the bedsides of the debilitated and the dying. I resort freely, though by no means carelessly, to wine-whey, wine undiluted, or warmed and spiced, brandy with water or milk, ammonia, ether, capsicum, or turpentine. Wine is usually the most manageable, as well as most permanent in its effect; but if it disappoint us or prove in any mode objectionable, the others may, in turn, be tried, while the surface is irritated by heat, friction, mustard, and epispastics.

The obvious analogy of the remittent with the malarious intermittent, and of the remission of the former with the apyrectic stage of the latter, long since suggested the employment of cinchona in protracted instances of autumnal fever of the present type. The practice is becoming everywhere more common to resort early to some one of the preparations of this powerful febrifuge in the remissions. Nay, our southern and western practitioners do not wait for an opportunity of this sort, but administer it generally after premising such depletory measures as may be demanded. Some, indeed, resort to it at once, without hesitation or delay. In many cases the effect is admirable and the results such as to justify the belief that this prompt use of quinine, without regard to the ancient routine of preparatory measures, is the greatest improvement made in the modern practice of physic. It will not always prove successful, yet the experiment deserves to be cautiously made. If the sulph. quinine in ordinary doses be offensive to the stomach, however, or determine to the head, as it will sometimes do, with increased pain, dizziness, tinnitus aurium, I would desist and fall back upon the less impressive but safer course already pointed out. The practice of administering this specific febrifuge during the progress of fever without waiting for a remission, is not entirely new, though it has been more emphatically pressed of late, and among American physicians. Cleghorn was probably the first to venture upon it, and after him Moore, towards the close of the last century; and the same course has been followed from time to time, and with some caution and reserve by many physicians, Hillary, Irvine, and others. It seems to answer especially well in the southern portion of our continent. In the remittent fever of Florida, Dr. Wright, of the U. S. A., says, it was his usual custom "to exhibit quinine in the dose of 20 grains at any period of the paroxysm. The practice was successful, not a single death having been reported during the season."

"The favorite practice in the United States army in Mexico, in 1847, consisted in the combination of quinine with mercurials. Dr. McCormick observed great caution in venesection, and gave blue mass and quinine together for the first 36 or 48 hours; and afterwards quinine in free doses. The proportion of deaths was not more than 1 in 20." Many additional authorities might be quoted to the same purport.

The great impediment presented to the reception of internal medicines at the commencement of most attacks, and throughout the whole duration of many, by the irritability of stomach forming so urgent and prominent a symptom of this familiar disease, constitutes, perhaps, the most embarrassing circumstance in its treatment. It is important to inquire into its cause and origin. If it depend upon the accidental presence of undigested food or other oppressive contents, these must be got rid of. If connected with heat and burning at the epigastrium; if there be soreness there and pain, increased on pressure externally, we should apprehend the supervention of inflammation, and resort at once to topical bloodletting, fomentations, mustard poultices, and, after a time, vesicatories. In such cases, the mercurial treatment, of which I am shortly to speak, offers the best prospect of advantage to the patient.

A vast number of palliatives or minor remedies may be found in the books and in the hands of nurses, none of which, however, seem to me worthy of confidence. The saline draught in a state of effervescence; the alkalies, lime-water especially, with or without milk; common soda water, or water merely impregnated by pressure with carb. acid gas; these are refreshing, and may prove palliative. We may also derive a certain degree of benefit from small doses of anodyne, as in the pill of opium with or without camphor; minute quantities of each, as in the alkaline diaphoretic formerly mentioned, with tinct. opii camph.; the acet. plumbi has been eulogized here, too, but it is not often applicable. The administration of astringents, aromatics, and stimulants, infusion of ginger, cloves, cinnamon, etc., instead of allaying the vomiting and relieving nausea in inflammatory affections of the stomach, but add fuel to fire, and destroy the organ altogether.

The constipation of the early stages of fever is another troublesome contingency. Let me earnestly offer the warning, not to hope to overcome it by increasing the doses of active and irritating purgatives. The mildest and least offensive being selected, aid them by the use of the lancet if the strength permit; by the warm or rather tepid bath; by dashing, according to ancient custom, cold water upon the feet and legs, and by large enemata, which may mechanically distend the intestines.

Hiccup is a very annoying symptom, which, by its tedious pertinacity, will sometimes harass the unfortunate patient beyond endurance, depriving him of all rest or repose. It is among our serious prognostics of evil, showing itself when the case is progressing to its last and fatal stage; but I have seen it endure five, seven, and nine days, before convalescence commenced, in attacks that terminated favorably. It is difficult to relieve it. Opium, when there is nothing to contraindicate its exhibition, and the volatile oils, turpentine and chamomile especially, have appeared to exert most control over this distressing form of partial convulsion.

The mercurial treatment, so much and unreasonably denounced by some, and so sadly misused and abused by many, becomes occasionally a course of reasonable preference or absolute necessity: as, when the febrile attack comes on with peculiar or evident malignancy; if the vigor of the patient, the powers of his constitution, seem obviously disproportioned to the force with which it is assailed—if the disorders of the place or of the season have put on a generally unfavorable aspect, that is, in Sydenham's phrase, if the epidemic constitution of the air be bad—if the case, from any obscure cause, obstinately protract itself, and thus threaten to exhaust the strength of the sick man—or if he seem to be sinking into that prostrate and inexcitable condition, known as the typhoid stage. The dose prescribed should be adapted to the exigencies of each case, of which the prominent elements are the apparent rapidity of progress, and the danger of organic lesion. From two grains to ten of calomel may be repeated every second hour, alternately, or in combination with such other medicaments as are indicated. It is an especial recommendation of this plan, that it does not interfere with, or require the suspension of, any other appropriate remedies.

We must watch the patient most attentively while under this treatment; desist from it, if he improves decidedly, and the prognostics become favorable; if not, continue it until he complains of an uneasy sensation upon pressing his teeth together, or his gums grow thick, swollen, and tender, disposed to bleed or ulcerate, with a copperish taste in his mouth, and the well-known mercurial odor of the breath, the flow of saliva being increased and offensive. To this irritative and secretory excitement of the salivary glands, the good influences of mercury in fever were formerly ascribed; but ptyalism is of no importance probably, except as a token of the general condition of the system, which shows itself farther by the supervention frequently of a new type or variety of fever, with greater fulness of the vessels of the surface and heat of skin, and determination of fluids to the head generally as well as to the mouth, and to the mucous tissue of the intestines also. If the lips and cheeks and throat have been parched and dry, they are now moist and soft; if the bowels were confined, they are now moved easily and effectually; if the skin was dry, it is covered with perspiration; if cold and clammy, and relaxed, its warmth and circulation are restored.

I will not deny that ptyalism, when fully established, which, however, is not often necessary, is in itself a state of troublesome and annoying disease. I will not utter a word in extenuation of the calamity. It is an evil undoubtedly; but of evils, when forced upon us, it is rational to choose the least; and this is surely preferable to the continuance of a bilious remittent of the serious character I have described, as the alternative. When this mercurial action has been set up in the system, the original disorder is in a very great majority of instances subdued, supplanted, and made to disappear; to which we may add the remark, that under this plan of cure, there is much less liability to relapse, as it is called, of the remittent, or to the pertinacious infliction of an intermittent visitation.

The objections to the mercurial treatment of fever, founded on its occasional inefficacy, I scarcely consider worthy of a serious answer. They only go to show that man is mortal, and that under the present contingencies of human existence he will die, and die of curable diseases, too, in spite of our best skill and most efficient remedies.

The evils acknowledged, however, to arise not merely from the abuse, but sometimes even from the judicious use of mercury, though prodigiously exaggerated, yet afford fair ground for another set of objections which deserve our impartial consideration. Of course, the resort to it must not be made in slight attacks, nor unless the case is of so serious a nature, and implies so much danger to the patient's life, or future health and comfort, as to justify us in subjecting him to the annoyance of a tormenting sore mouth, with the chance of more or less injury to his teeth and their alveolar sockets, and the extension of inflammation and gangrene. These malignant influences of the mercurial are most likely to be developed in the very young, and children, and in this class of patients I would feel much reluctance to depend upon it.

The convalescence from bilious remittent is occasionally slow, tedious, and interrupted with annoyances that require the attentive observation and judicious interference of the physician. We shall not be surprised at this when we reflect that the invalid is still surrounded with the atmospheric influences to which we attribute the disease that has assailed him; and that the several organs which have suffered from the concussions of fever must continue for a time enfeebled and irritable, and in a greater or less degree incapacitated for the resumption of their ordinary functions. As the abdominal viscera have chiefly borne the onus of morbid action, so they are most likely to continue disordered. There is apt to be costiveness on the one hand, or on the other a disposition to diarrhœa. Sometimes we have to contend with an uncontrollable appetite, which runs far beyond the powers of digestion; at others, there is prolonged anorexia with gastric languor and inactivity. Jaundice occasionally presents itself, or there may be entire torpor of the liver with whitish or clay-colored stools; the muscular debility of the patient remains in some instances so long and exists in such degree, as to excite fears of spinal affection, and consequent paraplegia, which indeed I have known in one or two instances; added to all this, there is a notable proclivity to relapse, or recurrence of the scarcely vanquished malady, or the supervention of a troublesome intermittent. To conduct the invalid safely through all these obstacles and difficulties, will often require great vigilance and sagacity.

A mild laxative if the bowels are constipated; the tinct. kino or some other astringent if too loose; an occasional blue pill at proper intervals if there be hepatic obstruction or derangement, with the use, perhaps, of some of the bitters or mineral tonics, of which the preparations of iron are generally preferable; these will form the brief catalogue of prescriptions which it may become necessary to administer. The appetite is usually strong, and may require to be restrained, as undue indulgence in this respect has often produced injurious, nay, it is said, even fatal consequences. It has been disputed whether fluid or solid, animal or vegetable food is best adapted. I allow myself to be guided much by the patient's habits in health, and his ordinary mode of living, restraining the quantity of everything taken within strict limits. For the most part, fluid or semi-fluid, farinaceous articles agree best at first, then thin soups or broths, and after a short time, the lighter meats very plainly prepared. If the appetite be defective or irregular, a little sound old wine, sherry or Madeira, may be allowed, or, at the patient's choice, a little porter or ale.

One of the earliest symptoms of recovery is apt to be shown in the disposition to sleep—calm, tranquil, and refreshing sleep; but the convalescent is sometimes troubled by a morbid vigilance, which, if suffered to vex him long, will be likely to usher in a train of unpleasant consequences. A well-timed anodyne will obviate all these. If opium do not agree, cicuta or hyoscyamus may be substituted; the tinct. of hop, the hop-pillow, and lactucarium are recommended, and may be tried.

After all, however, the best of our tonics, the surest means of restoring a regular appetite and good digestion, and of obtaining sound and refreshing sleep, is exercise, allowed in proportion as the patient can bear it. His muscular strength will suffice, at first, for nothing more than mere change of position in bed, or of place in his chamber, but will increase rapidly with this use of it. The exercises of gestation will soon be borne without inordinate fatigue, swinging, sailing, riding in a carriage, and finally on horseback. There is nothing comparable to this latter as a promoter of appetite, of bodily and mental vigor, and profound and sweet repose.

If the case was such as to have required the mercurial treatment, and ptyalism has occurred, the sore mouth will be an obstinate and grievous annoyance; to remove which, is a problem of very difficult solution. Time would fail me in the attempt merely to enumerate the various means of cure proposed. Ice, and other sedatives, acet. plumbi, borax, etc., are recommended on one hand, warm infusions, nay, even steam, tar-water, and turpentine on the other; astringents of all kinds are employed, mineral and vegetable, bark, green tea, the mineral acids, the sulphates of zinc and copper. The hydrosulphuret of potass is highly spoken of by some German writers. Hosack and others have resorted to emetics, frequently repeated; but this remedy seems worse than the disease. Vesicatories applied to the back of the neck and behind the ears may do good as revulsives. I prefer to enjoin upon the sufferer merely the necessity of frequent washing of the mouth, for the sake of nice cleanliness, and this may be done with laudanum and water, which perhaps diminishes somewhat the irritability of the ulcerated surfaces.

CONGESTIVE FEVER.—While I refuse to admit that there is any form or type of fever to which this title is exclusively appropriate, I comply with the custom among American writers, who thus denote a particular class. Fevers present to our observation a mingled mass of irritations, inflammations, and congestions, and I am ready to acknowledge the practical benefit of treating separately of such attacks as are described under this appellation. The varied prominence of the conditions occasions well-marked differences; in some, the symptoms of inflammatory determination to certain organs are most strongly pronounced; in others, the tokens of irritation; and in others still, those of congestion, properly so called, predominate. None of these are new, either in medical writings or practice; but it cannot be denied that within a few years past there has been a striking change in the general character of the malarious fevers of the southern and southwestern country, nay, all over the United States wherever these fevers are known. All practitioners agree that the open violence of febrile excitement which once belonged to them, has disappeared in the majority; and it is affirmed that in many localities the cases anciently known as "*algid*," "*pernicious*," "*syncopal*," "*lethargic*," and "*malignant*," instead of being merely occasional and occurring as dreaded exceptions, have come by their proportional numbers to form the portraiture, and in their frequency, the rule.

It is probable that congestive fever owes its peculiarities to the intensity or concentration of the febrific poison. By its vehement force, innervation is at once impaired, or more properly speaking, perverted; the capillary system of vessels is paralyzed; whence the congestion in the brain, lungs, and other viscera, the cold, shrunken surface, the dyspnœa, the laboring heart, the oppressed circulation.

All agree to ascribe it to malaria as its cause; it is only found in malarious localities. It prevailed with special violence in and about Knoxville, East Tennessee, in 1837 and 1838, and it was then I first saw its strongly pronounced features. It is of frequent occurrence in Florida and Alabama, and over the fertile prairies and vast undulating plains of our western interior.

It is a periodical form of fever chiefly of remittent type, but sometimes intermittent, quotidian, or tertian; never, I think, encountered as a quartan. The *malignant intermittents and remittents* described by writers of France and Italy, if not identical with it, resemble it very closely.

We may subdivide congestive fevers into four groups, relatively to the seat of determination, and the prominent symptoms:—

1*st*. The *cerebral*, in which there is stupor, or tendency to or absolute coma, sometimes terminating in apoplectic oppression with effusion, sometimes complicated with convulsions. The cold stage is not very intense, but protracted; the pulse usually slow and full, but unresisting; the face flushed or livid; the breathing laborious but slow, with sighing and often with moaning.

2*d*. The *thoracic*. This is characterized by urgent dyspnœa, the respiration being performed with gasps and struggles, and at prolonged intervals, the patient eagerly seeking air, rising from bed and rushing to door or window. Parry, of Indiana, says he has "seen persons get out of bed and stand in the doorway—such was the intense desire for air—long after the pulse had ceased at the wrist." Holmes, who saw it in Florida, as a remittent, speaks of the force of the attack as overwhelming: "the changes are sometimes so hurried, that from comparative health, the patient will in half an hour be nearly beyond relief." The pulse is frequent and feeble, the face pale or livid, the countenance haggard, the skin moist and cold.

3*d*. The *abdominal*. In some of these cases, nothing is complained of but a sense of sinking at the præcordia; in others, there is a constant and oppressive nausea; the skin being moist and cool, and the pulse frequent and thready. In others, there is diarrhœa, or it may be dysentery, with intense tormina and tenesmus, and numerous dejections of muco-sanguineous or sero-sanguinolent matters. Meteorism and hiccup precede death. I saw a strong and healthy man who lay constantly on his side with his hands immersed in iced water, making little or no complaint except that if he removed his hands, or if the water became warm, uncontrollable vomiting came on. His pulse was full, soft, and regular; the invading chill had been severe; his face was somewhat flushed; he died on the 5th day. Such cases were frequent in that neighborhood, as I was informed. The physician who attended him was similarly attacked a few days after, and died in the same way.

4th. The *necræmial.* I use this phrase after Williams, not knowing better how to denote the form in which the blood seems to have lost its vitality at once, poisoned. There is little or no suffering in these cases generally. The patients sink rapidly into collapse. The skin is often very cold, whence the phrase "algid," applied to them. Hort gives two such instances in which death took place in less than twelve hours from the commencement of the chill, in stout, robust men. The first is described as showing "a chill increasing in intensity without any respite until it terminated in the icy coldness of death. The nervous system was completely overwhelmed and paralyzed, except a feeble internal action of the bloodvessels, and equally feeble respiration." The second is spoken of as "attacked with the same symptoms, but dying two or three hours sooner."

In the ordinary cases of all these varied forms, the symptoms above recited are of course more pronounced during the exacerbation. If the type be intermittent, they may, indeed, disappear in the apyrexia or subside entirely. In a case of the third variety, where the determination was to the bowels, dysenteric, of quotidian recurrence, there was in the intervals little or no discomfort; but the patient sunk and died on the third day.

Autopsy.—1. In the *cerebral* cases, it is almost always found upon examination that some effusion has taken place within the ventricles or at the base of the brain. Clots of blood have been found in the cerebral substance.

2. Of the *thoracic* form we have from Holmes a description: "The abdominal viscera and contents of cranium were in a healthy state; the skin around the whole chest was discolored by extravasated blood; the vessels of the heart were deeply engorged with blood, the auricles and right ventricle were filled; the lungs bled as if a sponge had been cut that was soaked in blood; the whole blood of the body seemed to have found a common reservoir in the thorax."

3. Of the *abdominal.* Boling, of Alabama, tells us "that the internal heat of the viscera was greater than he had ever found it in any other disease; not only extremely disagreeable, but almost insupportable to the hand." Lewis found in one instance "the whole internal surface of the stomach of a dark red and the mucous coat softened." Ames says: "There is always some evidence of inflammation in the

large or small intestines." In 8 out of 11 examined in Mobile, by Lewis, "the mucous coat of the stomach was much softened, giving way under very little force; of a dull pearl color with the exception of here and there a deep red patch very circumscribed; in 2 of the 8 it was thickened, raised, and pulpy, coming off before the nail or scalpel-handle like a thick gelatinous or stringy mucus."

I have no record of any *post-mortem* examination in the fourth class of necræmial cases, as contradistinguished from the other varieties.

Pathology.—If it were not for the frequent intermittence and marked remission of this condition of congestion, we might ascribe all the phenomena simply to "intoxication" or poisoning of the blood. As Prof. Draper has shown the dependence of the capillary circulation upon the quantity and healthy state of this fluid and its capacity to act by affinity upon the internal surface of the vessels, it is evident that any morbid change or impairment of these qualities will affect and impair its motivity, more or less, to complete stagnation. But there are two objections to the sufficiency of this explanation: 1st. The facts that such congestions occur and prove fatal when no malarious influences are present; and, 2d. The intermission of all the phenomena, and their recurrence, even in aggravated violence, the subject having been removed from the source of malaria, and having received no additional dose. The action of the cause, whatever that may be, cold, perhaps, in one case, malaria in another, the matter of contagion in a third, paralyzes the extreme organs of circulation, the capillary vessels. These, it is evident, must be in a living and susceptible condition in order that they may act or be acted on by the blood, which may or may not be poisoned, but which cannot pass along inanimate tubes, or passes along slowly and with obstruction through tubes whose vitality is impaired. The functions of these minute vessels are more or less completely suspended. The tissual elasticity and contractility of the arteries tend to impel their contents and empty them, while the veins and parenchymatous structures are engorged. Hence the congestions we are speaking of. But there are obvious reasons in the nature of the cerebral and pulmonary circulation to render the lungs and brain the ready seats of this engorgement, and all casual attacks will, I think, be found either cerebral or pulmonary. I have seen two impressive examples of the latter; both of them occurring at the end of winter, in February and March. One, a young man, sat down to breakfast in good health, but began to complain of pain in the chest and dyspnœa, which increased in intensity until with some chilliness and irremediable prostration he died—in about six hours. The second, a lady suffering under slight catarrhal fever, rose about six o'clock in the morning, and while dressing became chilly with shivering. These symptoms were followed by dyspnœa, and her physician was sent for. I saw her with him about mid-day—and she died three hours after. In these cases all the resources of art to relieve local determination of seemingly passive character—simply congestive—were exhausted, but in vain.

Nor do we find any clearer explanation of the facts in the reference to the nervous theory of intermittent fever. Prof. Jones, of Ga., tells us that the action of the malarial poison is attended by marked diminution of the solid constituents of the urine. He has also discovered that the same poison "either directly or indirectly destroys the colored blood corpuscles." If the brain and nerves be affected by the necræmial intoxication, how can we comprehend the sudden relief during the apyrexia? It does not suffice here to take refuge in the dogma that "the life of the cerebro-spinal nervous system is periodical," as accounting for the periodicity of these fevers by their assumed radication in that system. The same primary symptoms present themselves in the other and more continuous forms of fever; the congestion; the chill; the pains; pandiculation, &c. Our best hypotheses upon all these topics must be confessed to be nothing more than ingenious conjectures.

Treatment.—There are certain general principles that apply to all the forms, yet admit of modifications adapted to each. Nothing is so important or efficient as quina here, our best and truest specific. How it acts would be most difficult to explain; we know whither its efficacy tends. It affects in some peculiar manner the nervous system; it acts upon the brain. This is its obvious and characteristic function, and in this regard we may entitle it a narcotic. "It is," says Drake, "a calmant, a tranquillizer;" yet it disturbs in its own special method. Quininism, is, if we may trust our sensations, a state of irritation; the subject is restless, excited. It seems to restore the impaired activity, the "polarity" of the torpid cerebro-spinal axis, and thus arouse the dormant functions, which all depend upon sensorial activity. It is affirmed to influence the urinary excretion, and thus promote the elimination of effete and injurious elements. It is not, prominently, a stimulant to the circulation; if Mendenhall has found it increase, others affirm that they have known it diminish the frequency of the pulse. It dulls the hearing and dims the sight. It is accused of producing coma, diarrhœa, abortion. On looking over the catalogue of poisonous effects ascribed to it, one is struck with their resemblance to the symptoms of "pernicious fevers." Yet it requires most reckless administration of inordinate doses to do injury with it. Holmes' minimum dose was 18 grains, his maximum 80. Maillot gave, in a cerebral case, a potion containing 40 grains, and an enema containing 60. I speak of the disulphate of quinine, usually prescribed. Bazire, of Martainville, died from the effects of 900 grains; his wife recovered with difficulty, having taken 300. I have known 60 grain doses repeated thrice within the 24 hours, and an ounce to have been once given in the same course of time. These doses seem to be unnecessarily, wastefully, dangerously large. From 10 to 30 are quite sufficient in any case. In general I prefer to repeat smaller quantities more frequently, as from 5 to 10 grains every hour. I am persuaded that this remarkable drug presents the seemingly incompatible qualities of acting with great rapidity, and of reaching slowly its maximum point of action. Holmes places this at as great a distance as 18 hours. When the patient does not swallow or cannot retain it, we may use a double amount as an enema. Cathartics are considered also as generally applicable by many practitioners; I would except cases in which free diarrhœa and extreme prostration were prominent. In all others it may be well to employ the mercurial, or, if the patient be feeble, turpentine, so as to procure a derivative and revulsive effect upon the bowels, which may be aided by irritating enemata.

Counter-irritants should be applied extensively; heat, mustard, and epispastics. The hot bath, when the skin is cold and shrunk, should be followed by assiduous friction with acids, or hot alcoholic spirits.

In the cerebral cases, the lancet has been used sometimes with good effect. Dr. Wootten gives two successful instances. Leeches have been applied to the temples and the mastoid processes with benefit; ice and cold affusion have proved serviceable.

The thoracic variety has proved most indomitable of all. The course most strongly advised is the administration of a quick emetic of mustard and salt; external friction and irritants; stimulant purgatives, such as turpentine, in large doses, by the mouth and enema; the hot bath; laudanum, brandy, and ether. This last article was most depended on in the algid fevers which assailed the French army during their occupation of Rome in 1848–49. If at hand, I would experiment on these desperate cases with electricity and galvanism, nitrous oxide gas and chloroform; both by inhalation, and in free amount, taken internally at the commencement of the attack.

In the abdominal we have far more to hope. I have seen the sulphate of quinine given alone in doses of 8 and 10 grains, in the gastric variety above described, promptly and permanently relieve the patient, changing his whole condition, and arresting his disease within a very few hours. In the diarrhœal or dysenteric, large doses of opium do good service. Hort succeeded in one such in giving relief with 8 grains in substance. Anodyne enemata are also useful, and the warm bath a good adjuvant.

The necræmial, "algid," "pernicious" forms of malarious fever require the prompt administration of our highest order of stimulants, internally and externally, brandy and ether in no timid quantities; combined, of course, as in all the other varieties, let it be distinctly understood, and as of the most universal application and highest importance, with free doses of quinine, without which all other treatment is nugatory or uncertain.

Convalescence from congestive fever is always slow and vacillating, and should be aided by tonics, of which the infusion and tincture of cinchona, and the preparations of iron, are the best; and by generous diet, change of air, and exercise, carefully adapted to the patient's strength.

COUNTRY FEVER.—This is a title given familiarly in the cities of the South, and especially in frequent use in Charleston, South Carolina, to a modification of bilious or malarious fever, originating in *transient* exposure to the intensely concentrated malaria of the low country; as by sleeping a night or two upon a rice plantation during the summer and autumnal months. The sudden heats of spring sometimes develop it as early as May; nay, I have known instances originate from special exposure in April. Experience shows that such an is ended with some peculiar hazards, and there has been tion as to the obscure cause of such additional malignity as by a removal during the latent period to a city e difficulty is increased by our knowledge of the fact avation of the danger of the endemic remittents of the as nd others inform us, results upon similar removal to al nds, from low miasmatic spots, during the same in- of uation. And I have myself observed, while residing in no salubrious of all regions, which lies among the mountains of Carolina, along the valley of the Saliko, that cases, which were there, after exposure in the malarious districts, either of r west, from Tennessee, Carolina, or Alabama, presented the ar features. The progress of the attack is irregular, and missions uncertain, both in time of occurrence and duration, as in degree. The type is ex edingly complicated, obscure, confused. A rapid succession of expected or accumulated ex- ations, the herosthesis of the ancie ts, annoys and distresses, and out the patient.

prognosis in this variety of is unfavorable in a large pro- n of instances, and the rate nortality considerable. The yields rapidly under the sub rant exacerbations so quickly each other, each more prostra ng than its predecessor.

reatment must be prompt and de ided. Our best dependence, ery commencement, is upon the combination of the mer- sulphate of quinine, in e nt doses. Ten grains of each ay be given at first, and half the quantity at intervals of two hours, until the bowels are moved, when the calomel may be omitted, persisting with the quinine until quininism has been induced, which must be kept up for 72 hours at least, for fear of a return of the attack; the proclivity to such relapse being very great.

In the meanwhile, determinations to important organs must be met by the active but prudent employment of the revulsive and palliative measures already recited in detail.

To this general history of remittent fever in its several modifications, I will add here a notice of "the MOUNTAIN FEVER of California," as I find it denominated by Dr. Ewing, who describes it in a well-written paper in the *St. Louis Medical and Surgical Journal* for March, 1855.

"On my way to California," says Dr. E., "I encountered a peculiar form of fever, assuming the remittent type; its locality is the high mountainous regions; I have never known a case occur below the altitude of 7,000 feet above the level of the sea. The first cases that I saw were at or near the South Pass of the Rocky Mountains, and they are met with even in the mines of the mountains." The symptoms were faintness or languor, extreme weariness, a feeling of hunger, as if there was a vacuum in the stomach; the eyes were hot and heavy, with twitching of the cilia and of the muscles of the face; there was excruciating neuralgic pain throughout the whole body, with deap-seated aching in the extremities and back; a dull headache, and sometimes epistaxis. The pulse was for awhile somewhat frequent, full, and corded, but after awhile loses volume, and becomes thready and very frequent; there is fulness in the chest, with sighing, and the inspirations are diminished in frequency and depth. These symptoms last from two to six hours, when a gradual remission takes place; the patient is pale, begs to be left alone, and lies quite still, suffering great pain when he moves; his pulse is weak, and beats from 90 to 120 in a minute. Thus pass 10 or 15 hours, when the exacerbation returns. The type is quotidian: the duration variable, from a few days to some weeks. It assumes not rarely the typhoid character, and terminates with serous diarrhœa.

The *diagnosis* was made, from common bilious remittent by the locality of its occurrence, and by the absence of irritability of stomach; from typhus, by the suddenness of its onset, and by its want of exanthematous eruption; from rheumatism, by its periodicity and the freedom from swelling of the joints.

Of the *cause.*—Dr. E. thinks malaria out of the question. None of the sources of malaria are to be found in that lofty region, and it attacks persons who have resided in the mountains for years. It assailed in preference the most robust and healthy subjects, whose chests were well developed and lungs capacious. He regards the rarity of the high, thin atmosphere as the true cause; and asks, "if rarity of air can cause fever on the Rocky Mountains, why is it not malaria?"

The *treatment*, which was generally successful, was very similar to that which is adapted to ordinary remittents, except that some ano dyne was early mingled with the other remedies to relieve the severe pains, with which the attack came on.

INFANTILE REMITTENT.—I proceed next to treat of that form of remittent fever which, appearing in young subjects only, has received the appellation of infantile remittent, or the remittent of children, and from its being often attended by, or complicated with the tokens of verminous irritation, has been ascribed by the common people, and by some physicians, exclusively to the presence and undue number of intestinal worms, and hence familiarly called *worm-fever.*

As to its source and origin, however, there is much difference of opinion. While the popular notion of its nature and cause has received the support of many respectable practitioners, there are not wanting those, on the other hand, who deny entirely the agency of worms in its production in any case. Of these, Dr. Butter stands first, and is regarded as weighty authority. Dr. Rush sides with him unhesitatingly, and, indeed, maintains that these parasitic animals, so much dreaded and denounced, are at least innoxious, if, indeed, they are not useful and serviceable in the human economy. Dr. Hunter declares that he has in vain searched for them in the bodies of children who had died of this type of fever; and Good goes to the unwarrantable length of asserting, "that there is no instance on record of their having been traced in such bodies." The Italian Brera is disposed to consider "what have been denominated worm-fevers, as in reality low fevers—gastric and adynamic, during which worms multiply and grow in those parts of the body that are most enfeebled."

This latter view of the subject is plausible, and has been readily adopted, as offering a sort of compromise between opposing authorities, and explaining facts apparently contradictory. Nevertheless, there is not a doubt in my mind that the irritation occasioned by the presence of intestinal worms upon the mobile constitutions of children, is fully capable of developing this form of fever, nay, that it is by no means an unfrequent cause. We often succeed, by the employment of proper remedies, in procuring their expulsion in considerable numbers early in the attack, so early as not to admit of the explanation suggested by Brera. We find them coming away at all its successive stages, and their removal or the subtraction from their numbers will always be followed by obvious relief; sometimes, indeed, by sudden and entire cure. In reply to the definite, but erroneous positions of Hunter and Good, I will affirm that I have repeatedly seen them in masses in the intestines of children who have died of this fever.

Yet, we must by no means run into the opposite extreme, as some have done, and attribute the infantile remittent to verminous irritation as its exclusive exciting cause, nor perhaps, even its most general or ordinary source. Any species of gastric or intestinal derangement, any disorder of the chylopoietic viscera, may give rise, under certain contingencies, to the same concurrence of symptoms. Fruit, eaten unripe or decayed; ill-cooked vegetables; unwholesome bread; salted meats, and, indeed, bad diet of every sort, will produce it. I have seen it as the result of a neglected, dirty condition of the clothes and skin of a child, and of confinement to a close, ill-ventilated sleeping apartment. We usually meet with this variety of remittent in subjects between three and twelve years of age—a period, during which, for whatever reason, worms are apt to be most numerous and troublesome. The earlier symptoms are those of derangement of the digestive organs. The appetite is observed to be irregular and uncertain—either morbidly voracious or entirely wanting; the bowels are sometimes costive—at others, there is diarrhœa, with ill-looking, offensive mucous stools, passed with griping and tenesmus; the tongue is foul and thickly furred, sodden, swollen and indented, and the breath particularly fetid. The patient is restless, and the nights uneasy and disturbed; the skin is hot and dry, with much thirst, and a pulse frequent, jerking and irregular; as morning comes on, the febrile symptoms abate, with, or without sweating, and the child sleeps, perhaps very soundly and heavily—or, as is more commonly observed, with much starting and muttering, and grinding of the teeth.

As the disease progresses, the tokens of abdominal disorder increase in intensity; there is constant pain in the belly, which is swollen and tense, sometimes full and hard, and at others, elastic and rebounding: the tongue becomes fiery red, and is covered with small ulcers, spreading over the lips and the corners of the mouth, which are obstinately sore; the nostrils are inflamed and affected with incessant itching, whence the habit arises of perpetually rubbing and picking the nose; the skin of the face, and especially of the eyelids, is puffed, and of a transparent paleness; the extremities are tense, with a soft, pale swelling.

Cerebral determination frequently becomes prominent in these latter stages; a light delirium shows itself, with screaming at intervals—or stupor ensues, with coma and strabismus, and other concomitants of hydrocephalic effusion. Convulsions ultimately supervene, and death soon follows.

An American writer of high reputation, lays down as a diagnostic of this form of fever, which he treats of under the title of worm fever, "that the exacerbations are always attended with heavy drowsiness, and the remissions with morbid vigilance." This is not uniformly so; perhaps the majority of cases would rather furnish grounds for the statement made by Good, who mentions it as a "singular fact, that if the exacerbation take place in the night, there is wakefulness and jactitation; if in the daytime, drowsiness and stupor." I would not, however, venture to affirm, with either of these authorities, such a regular and invariable correspondence between the state or stage of fever and the disposition to vigilance or sleep. The contrary might, indeed, seem to be fairly inferable from the inconsistency of their observations; and, accordingly, I have seen, in different cases, nay, even at different times in the same case, drowsiness, remission and exacerbation, coming on by day and by night promiscuously.

I am inclined to consider the attack of this disease as often identical with our autumnal malarious fever; it is of most frequent occurrence here during the summer and fall, owing probably to the quantities of fruit then obtainable by children, and devoured by them in an improper condition, half ripe or half decayed, and very imperfectly masticated. I have met with it perfectly well marked, however, in all the months of the year; and it is known, not unfamiliarly, in situations where the influence of malaria is altogether unperceived.

It claims to be ranked properly among remittents, in the majority of cases by the distinctness or degree of abatement of the febrile symptoms, and the duration—the proportionate duration of this abatement. It is not regular or calculable in its time of access, invading sometimes at noon, but most usually in the evening or at night. The exacerbation does not often last longer than from nine to twelve hours.

West—always to be referred to with respect—considers this a form of continued or typhoid fever. He describes it as often presenting two exacerbations in the 24 hours, and as exhibiting sometimes the characteristic eruption. It is, indeed, probably as it occurs in general, the ordinary prevailing fever of every locality—malarious or continued, modified by age and other coincident contingencies.

Autopsy.—I have already mentioned the presence of great numbers of worms in bodies dead of infantile remittent. I have seen the intestines literally filled with them. The mucous surface exhibits every effect of irritation produced by them, from simple redness to ulcer and perforation. The bowel is sometimes found contracted here and there, and thickened in substance, and intussusceptions not unfrequently met with. The mesenteric glands have been seen enlarged and indurated: the liver and spleen engorged, augmented in size, and harder and heavier than natural.

The general *prognosis* is favorable, and the proportion of deaths under proper care. Special danger in any case, is shown by the inence of all tokens that denote actual inflammation of the abinal viscera, such as great tenderness on pressure, with large swellor tympanitic tension. Dysenteric stools are unfavorable signs. supervention of cerebral disturbance is also menacing, as shown requent screaming, or violent delirium, or by strabismus, coma, or ilsions.

atment.—The view which has been taken of the nature of this fever and of its causes, will point out the course necessary to d upon. The prompt administration of an active cathartic is ated too plainly to allow of any dispute or hesitation. Calomel ery way entitled to be selected, but its operation must be hast- combination with some quicker article. We may choose, for purpose, either rhubarb or castor or, if we have reason to sus- the presence of worms, some one f the numerous class of anintics may be added. I am sati ed, that it is not safe to trust atient exclusively to the action the neutral salts, so highly ized by Dr. Butter. The bowe are often torpid, loaded, and ged with foul tenacious mucus, an ther viscid secretions, which be brought away, and this complete and effectual evacuation of vine canal can only be effected by neans of the oily and resinous ves. The stools, from the neu l salts, are thin and watery; e urge them long, we shall bri on with them severe griping arsh irritation, before we succeed expelling the worms which present, or their foul nidus, the rbid secretions above alluded discharges which give most relief to the patient, and seem productive of most permanent benefit, will be noticed to be of some consistence, dark greenish probably, or even black and highly offensive.

The anthelmintics which I prefer to employ in the case before us, are the spigelia marilandica, camphor, and the spts. terebinth. Concerning the first of these, I will remark, that its usefulness here does not by any means seem to depend exclusively upon its vermifuge properties, at least so far as these are displayed in the expulsion of worms. I have often seen the most decided advantage from its exhibition, when not a single worm was discharged, and when, indeed, there was no definite proof of their presence. Perhaps, it may have some beneficial effect as a narcotic, in diminishing the irritation and irritability of both the intestines and the general constitution. Its action in this way requires, however, to be watched and regulated; in an overdose, it will determine dangerously to the head, occasioning tremors, starting, vertigo, blindness, dilatation of the pupil and convulsions.

The spts. terebinth. is a very efficient addition to the common domestic cathartic, castor oil, an article of infinite value in the management of the diseases of children generally. If properly employed, there is no reason to dread from turpentine that acrid and unduly violent operation, the expectation of which has induced so many to avoid or neglect it. I have found it, in the combination just mentioned, rather a mild than irritating purgative; and in the hands of many reporters, it has been declared not only safe, but particularly beneficial in numerous pyreotic and inflammatory affections, as metritis and peritonitis.

Camphor, in small doses, may be serviceably mingled with all of our formulæ. Its aroma is, doubtless, as disagreeable to the parasitic vermin aimed at, as it is pleasantly cordial to the patient; it acts also as a tonic and diaphoretic. Its use may be continued through the several stages of convalescence, in which it is supposed to prevent a return of the verminous irritation by preventing the increase of the troublesome animals. With similar views, the infusion of the bark of the root of our Pride of India tree, the *Melia azedarach*, is often prescribed; it is a good tonic as well as an approved vermifuge.

During the attack, and in all its stages, we shall find the frequent employment of the warm bath a remedy of much importance and value. It determines well to the skin, tranquillizes the disturbed stomach, and procures refreshing sleep. Warm poultices, sinapisms, and fomentations should be applied to remove local determination to the chest or abdomen. If directed to the head, the affusion of cold water upon that part, from some little elevation, will be found efficient as a means of relief; and should be promptly resorted to, and repeated as often as occasion may demand.

Diarrhoea sometimes appears early, and is disposed to continue long. It yields, perhaps, to a proper dose of calomel with cret. ppt. and a small amount of Dover's powder; but, if obstinate, must be restrained by astringents and anodynes. The cretaceous mixture with the tinct. kino will rarely fail to check it; after which, we may employ some alkaline solution with the tinct. opii camphorata. The good effect of these will be hastened by the administration of mucilaginous enemata with tinct. opii in small amount.

As soon as an intermission of fever occurs, cinchona should be resorted to; and if the case be protracted, I would not wait for an intermission, but take advantage of the period of remission for the purpose. The little patient will take quinine very reluctantly, if at all, but the infus. of cinchona et serpentaria may be made less disgusting by the addition of some alkali and aromatic, and should perhaps on this account be preferred.

During convalescence, the diet should be light, plain, easily digestible, and cautiously limited in quantity. The utmost attention to cleanliness of person, clothing, bed, and chamber, must be enforced strictly, and permanently enjoined.

If the convalescent be very young or specially thoughtless, the superintendence of some intelligent nurse will continue to be required, in regard to the control of his appetite and the general regulation of his habits.

CONTINUED FEVER.

A continued fever, in the strict meaning of the word, is said in some of the books never to be met with. But it is hypercritical thus to object to the phrase, as if it were intended to imply an exact uniformity in the progress of a fever, and an unvarying equality in the degree of excitement present in all its stages. The distinction aimed at is pathologically proper, and practically useful, and ought to be retained.

The class of continued fevers may be defined, so as to include those which run their course without any such abatement or relaxation of the symptoms as shall notably affect the condition of the patient; their remissions, as they are called from analogy, and in compliance with custom, being unimportant in degree, uncertain in period of access, and transient or varying in duration.

I have dwelt upon the relation which seems to exist between our as remittent and the tertian type of intermittent; writers have ned a similar correspondence between the continued and quotidian; the remark doubtless has some foundation in truth. The abate- nt of intensity of symptoms in class we are now considering, noticeable at all, occurs for t ost part in the morning; the rbation, commencing early in e forenoon, gathers strength ughout the day, and arrives at naximum in the evening; be- ing to decline, perhaps, at or t midnight, with more or less nation to sleep, and usually a moisture of the skin. Every vidual of the class is, however rked and distinguished by its peculiarities, that we must each separately, to give any and proper views of the subj

YELLOW FEVER. (*Hæmagastric pe ice* of Copland.)—The nature his disease, and the name by which it ought properly to be designated, have been matters of infinite dispute; and in this conflict of sentiment each writer has given it the title best suited to his own views of its origin, history, and character. It derives from Cullen its cognomen of typhus icterodes, expressing very well the light in which he regarded it, as a fever essentially of a low form, modified by derangement of the hepatic function. Armstrong has also made an effort to establish its pathological identity with typhus. Mosely, with directly opposite impressions, considers it to be the true causus, febris ardens, burning fever of the ancient writers. Pym styles it the Bulam fever, from its supposed origin in an obscure island of an African river. One of its oldest names is the Mal de Siam. Virey mentions it, I know not why, under the appellation of the Kendal fever. During the short-lived sway of the Broussaian doctrine of the gastro-enteric location of fever, it was spoken of as a gastro-duodenite, the stomach and duodenum being prominently assailed in its progress. The French West Indians know it as *la fièvre jaune, fièvre matelotte;* the Spanish Americans call it, from a striking symptom, *vomito negro, vomito prieto.*

The orange hue which tinges the skin and eyes in so very large a proportion of the cases, earlier or later, has given it the appellation by which it is so familiarly known among us, under which it will not fail to be universally recognized, and which I have therefore retained.

Most of those who have met with this malady regard it as a distinct form of fever, and attribute it, of course, to the agency of peculiar and specific causes; among which contagion is enumerated, and has been dwelt on by Pym, Fellows, Blane, Hosack, and Monette. Others, with Rush and Bancroft at their head, consider it as merely a malignant form of autumnal remittent, arising from the usual sources of intermittents and remittents—malaria in its various modifications, the effluvia from decaying vegetable matters.

Good, while he classes it with remittents, calling it epanetus malignus, prefers, as he says, the trivial adjunct yellow to that of paludal fever, because he believes that it may arise as well from contagion as from marsh miasmata.

Yellow fever is a distinct form of fever, consisting specifically of but one paroxysm; this may and does vary notably in duration, but whether long or short is never repeated; it is always single. The proofs of this doctrine are abundant. Rush, while describing the yellow fever of 1797, in Philadelphia, speaks of its analogy with the malignant state of smallpox, and observes: "The fever in both continues for three or four days without any remissions." Lining, in his graphic portraiture of the disease, as it prevailed in this city, employs language that does not admit of mistake; the uniform accuracy of which, for the last thirty-seven years, I can vouch for. Dr. McArthur, after having for six years the care of a public hospital in the West Indies, declares positively: "I have never noticed a remission during the whole course of the fever." The more recent testimony of Wilson, and of Blair and Davy, to the same effect, is also absolutely unequivocal.

The apparent exceptions to the rule thus laid down, may, I think, be readily explained and fairly accounted for. 1. The single paroxysm of which we have spoken may, and does often, sink the system irrecoverably, and terminate in death; or, on the other hand, it may, and does pass away, leaving the patient to prompt or progressive convalescence; or, producing an intermediate amount of influence, it may reduce the constitution to a stage fitted for the invasion of fever of uncertain type, varying according to the nature of the injury inflicted. Such febrile irritation, as truly consecutive and sympathetic as the secondary fever of smallpox, or the hectic attendant upon suppuration of the knee-joint, may arise from ordinary visceral obstruction, as of the liver and spleen, the consequence of the violent tumults of the first stage, and the derangement of the secretory function and organs thereby produced; or it may result from a degree of chronic inflammation remaining in some of the tissues that have been subjected to violent vascular determination.

2. The consecutive invasion of fever, which some describe as a returning exacerbation, and others have imagined to be "a relapse," so far from constituting any portion of the disease upon which it has supervened, stands in the same relation to it as diarrhœa to preceding measles, or dropsy to the obstinate intermittent or scarlatina which caused it. This sort of reaction, following the terrible exhaustion to which the patient has been reduced by the paroxysm or first stage of yellow fever, may even become a favorable accident, and add something to the chances of recovery. In the history of the Andalusian

epidemic of 1820, from the pen of the venerable Robert Jackson, a name worthy of the highest professional honor and esteem, this remark occurs: "The course of the attack appears to be sometimes suspended about the fifth or seventh day, by a stream of life thrown into the system at those times in a manner that cannot be explained, but that ds, by the new action produced, to avert death. The circulation, drawling and sluggish, becomes buoyant and active, the tongue mes a white and furred appearance, in short, a new train of febrile ement takes place, runs a given course, and terminates after a ration, sometimes favorably, sometimes otherwise."

error has been most plausibly based upon the actual inter- ng of the types of fever in malarial climates, their supervention one another. In any of the localities where yellow fever is mic, a remittent or intermi y at any stage of its progress ne the malignant character prevailing pestilence, locally nic. I have seen this hap peatedly. In the summer of many northern and foreig s had been induced to go as en up our rivers. Consider umbers of them were brought our hospitals with country fever oth remittent and intermittent, h, as soon as yellow fever b evalent, ran into that epidemic, ever becoming continued, a vomit ensuing. Dr. McArthur s that "many cases of rem ver under his care terminated endemic of yellow fever."

is fairly to be inferred from the ecords, that such was a very mon fact in the earlier history of the yellow fever of Augusta, , in 1839. The specific cause of his new malady, when introduced there, was of course mingled with the abundant malaria of the place and season, and until its influence became paramount, and in a certain sense exclusive, the effects of the two seem to have been combined. Hence the uncertainty at first expressed as to the nature and type of the disease.

An inquiry into the *causation* of yellow fever and the conditions which limit its endemic localization, and foster its epidemic extension and prevalence, will assist us materially in the effort to assign it a correct place in our pathological nosology, and to separate it from those other forms of fever with which it has so often, and, as I think, so mischievously been confounded.

Nothing seems to me more trifling or illogical than the attempt every day repeated—*usque ad nauseam*—to account for the production of this malady by references to influences and contingencies of local and limited power, and of transient application. In ascribing it as is the present fashion, to the continued operation of heat, malaria, animal and vegetable effluvia, we are totally unable to explain why these causes, acting together, do not generate it as well in Calcutta as in Vera Cruz; in Milo as in Havana; in Jerusalem or Naples as in Seville or Charleston.

Dr. Lining early remarked, concerning the disease when epidemic here, that it was exclusively confined to the city; from whence, he infers fairly enough, that some essential condition was wanting in the country which was present in town. This he believed to be contagion or infection, as he calls it. Bancroft ludicrously breaks out into a triumphant, but blundering commentary. "The advocates of contagion in America," he says, "when embarrassed by the well-known and admitted fact, that the disease never spreads in the country, pretend that the air is there too pure, which is doubtless true, if by purity they mean that it is not sufficiently charged with miasmata to produce fever." This imagined argument and his reply are alike fictitious, and show a complete ignorance of our local statistics. The low country air, so far from being too pure for fever, we know to be saturated with febrific miasma; but this miasm never generates yellow fever. Even in the city, where the malaria that gives rise to bilious remittent is sometimes active during the existence of yellow fever, their concurrence forms the exception and not the rule.

This remark was long since made of Charleston by Irvine, and by Rush, of Philadelphia. In looking over the bills of mortality, yellow fever years are not distinguished by any increase in the deaths from malarial fever, which ought to be the fact on Bancroft's supposition, but very strikingly the reverse. They have prevailed together but twice in the last quarter of a century, viz: in 1827 and 1835. On the contrary, the summer of 1824 was one of terrible pestilence in Charleston; but there were no bilious fevers, and the surrounding country was healthier than usual. I say no bilious fevers, for the number of deaths from it, recorded upon the bill of mortality, is smaller than on any other year that I can find. The same thing is true of 1828, when dengue preceded yellow fever. In 1837–38–39–40, there was yellow fever, but little or no bilious remittent. Here, then, the line of distinction is broadly drawn, there being present always subjects in abundance for the two forms of fever, their causes concurring as in 1827 and 1835. A native will be seized, on exposure, with bilious remittent, and a stranger with yellow fever. Elsewhere, the apparent contrast might be ascribed to an exclusive or paramount agency of a more intense or malignant vehemence of the generative cause, which, it is clearly evident, is not even supposable here.

It is matter of notoriety, that yellow fever shows itself almost exclusively in large commercial towns on the sea-coast or the shores of navigable rivers. Hence arose, very naturally, the idea of its importable and contagious nature, which has been the topic of such prolonged and angry dispute. It is believed, however, that we are aware of the fostering influence of some circumstances which favor its production, increase the chances of its invasion, and enhance its violence and malignity, and the extent of its prevalence. If its cause be in such places always present, the very point of most interesting inquiry, it is not always or annually active or efficient. Some of our summers pass by without offering any example of the disease, and many without its prevailing in any notable degree. It would surely be unwise to diminish the hope of this escape, year after year, by admitting any relaxation of quarantine restrictions. I would not place any undue reliance on the system, but I would keep up a rational supervision of the commerce with infected seaports, while I bent a steady attention to the internal police of each city; hoping much from rotective exertions of our Boards of Health, the industry of our ngers, and the kind and providential dispensation of storm, sun- e, and rain.

he merits of the general question of the contagiousness of yellow er have been long and warmly and ably argued; it is not too much say that of late it has assumed an entirely new aspect, and may be rded as having been as fully settled in the affirmative as we can hope to see any question of a pathological character. We, of the l profession, admit no umpire, no tribunal of last appeal, and e, our discussions are perpetual, and incapable of any final ad- ation.

t the history of the conveyance of this malignant pestilence from African coast to the island of Bo Vista, and afterwards even to ores of England; the recent ad of it from New Orleans up ver Mississippi, and along th rders of the Gulf of Mexico; obile, upon the railroad, to the station at Citronelle, and up the ma River to Selma and Montgo ery and elsewhere; and from h and Charleston to Darien a d Augusta, and Beaufort and own, leave us, I think, no longer any room for a reasonable At the New York Quarantine on Staten Island, we have a experimentum crucis annually repeated, which seems absolutely sive. Ships from infected ports detained in "the Narrows," mmunicate the disease to the beaut ful shores of the Estuary on sides, while the densely crowded a d foul metropolis is protected, scapes the pestilence spreading th ough the smiling villages and luxurious country residences in its immediate vicinity. Drake, who argues against the *contagiousness* of yellow fever, declares roundly, in summing up the various modes of its spread and propagation: "It has been produced by exposure to the air which has escaped from goods sent from a city where the disease prevailed."—Vol. ii. p. 208. This is a full admission of its transportability, communicability, and communication. As to its personal propagation directly from a sick to a healthy body, this is a point of far greater difficulty to establish, and far less importance. If we prove the body to be a mere fomites, and not a generating centre or source, we have gained nothing. Healthy persons as well as the sick must then be avoided as dangerous, though in a different manner. But this point, I maintain, is also fully decided. To the numerous examples, long since collected by Pym, Blane, Audouard, Wistar, Hosack, Vaché, Monette, and Strobel, we are now able to make an almost indefinite addition of facts contained in the story of the L'Eclair above referred to, and in the records of the recent epidemics of the southern country in 1852 and 1854. I select a single one from the report made to the American Medical Association in 1854, by Dr. Fenner, an able opponent of quarantine restrictions, and hitherto an ingenious and ready polemic and champion of the non-contagiousness of yellow fever. "A Mr. McManus, who lived on the hills of Hinds County, more than 40 miles from Vicksburg, went down to that city and remained there several days in 1841, when it was severely scourged by epidemic yellow fever. Returning home, he was soon attacked by yellow fever, of which he died, after throwing up black vomit. A few days after his death, his wife, who had nursed him assiduously during his illness, and had not been away from home, was attacked in a similar manner, and died with black vomit and yellowness. Their residence was in a high and healthy locality, where yellow fever was never known to prevail. Now, it is evident," says Dr. Fenner, "that Mr. McManus contracted his disease in Vicksburg; but if *any one can doubt* that Mrs. McManus caught the same disease from him, I must confess *it is more than I can do.*" (*Trans. Am. Med. Assoc.*, vol. vii. p. 539.)

We may now, I think, condense all that is clearly known of the generation of yellow fever in the following propositions:—

1st. This malady is the effect of a specific and peculiar cause.

2d. In certain localities, this obscure cause is permanent and always active; in others, it exhibits only an occasional activity, by which alone its presence can be inferred. In Vera Cruz, Havana, Kingston, it is perennially endemic; it is occasionally so in New Orleans, Mobile, Savannah, and Charleston; which last city seems to be placed upon its extreme northern limit of frequent invasion, or development.

3d. Its relation to season and temperature is equally well made out; being efficient only during the hot months of summer and autumn.

4th. Yellow fever is contagious; in other words, a case of yellow fever having been generated in favorable season and locality, by its unknown and undetected cause, becomes itself a generating centre productive of other cases, or of a morbid agent capable of producing them.

5th. It is transmissible from any one centre to another, or from any one of its generating centres to a healthy locality; and this communication or extension may take place in two modes, either by conveyance of a portion of atmosphere in which is diffused its undefined specific cause, as in the hold of a foul vessel, from any place where it prevails epidemically, or by the introduction of a sick body, or of any fomites imbued with its contagion.

6th. As a general rule, we may add that the contagiousness of yellow fever is limited by certain contingencies. This is Hosack's doctrine of contingent contagion; but the same circumstances limit the efficiency also of the generating cause, as indeed of all the alleged causes of yellow fever. Thus, high temperature is necessary to its production, existence, and extension. No matter *how* it is generated, the fact is known that it does not exist anywhere in winter. Hence it follows, that if carried into a cold region from a hot one, it will not diffuse itself.

Yellow fever is historically a disease of towns, of thronged and busy seaports; circumscribed usually within the limits of dense cities and their immediate suburbs; rarely met with in villages or farm-houses. It is emphatically a local, never has been a general epidemic. Heat, moisture, and malaria give rise to intermittents and remittents, and dysentery and jaundice, as readily on the borders of a solitary swamp or in a remote log hut, as in the most crowded street, nay, doubtless much more readily: yellow fever has been met with in foul ships at sea, but, as is stated, never unless they touched the coast somewhere;

and in secluded military and naval stations, but these present the general contingency of relatively dense population, and the exhalations or atmospheric vitiations produced by concentrating in small space considerable masses of men together. I do not profess to know the nature of these morbid changes in the air—the result of the conditions laid down. They are analogous with those which are recorded as exhibiting themselves at various periods in the production of many forms of pestilence. Yet, however nearly these modes of atmospheric vitiation may seem to resemble each other, they preserve in every instance a specific and exclusive character, favoring at one time the propagation of the sweating sickness; at another, of the black death; of typhus at a third.

behooves us to inquire whether the aerial changes to which we
ascribe the extension o ss, and which I think depend
ıys, and of necessity, upon tl ence of a *materies morbi*, how-
derived, are progressive or ve merely; in other words, do
norbid exhalations simply m selves by dispersion, agitation,
ositive exosmose throughout ir containing them? Or, as
y of our elders believed, are tl able of effecting in the animal
ılations, constantly thrown the atmosphere, any change
gous, as they were used to it, to fermentation or putre-
, by means of which proce whole mass becomes morbid
rrupt. These animal effluvia be the sustenance of the con-
ous or epidemic germ; a manur the fungus, a pabulum to the
g animalcule, or a nidus to its ova.

A contagious disease originating in any one spot, spreads thence not only by conveyance, but by "infected atmosphere," widening its sphere of influence gradually on all sides, "as some small pebble stirs the peaceful lake"—until it takes in the whole limit of a dense or concentrated population, but losing its force usually when it reaches an atmosphere free from concentrated animal effluvia. Hence, in the phrase of Lining, "no one having received the yellow fever in the city, and being taken on his return to the country, communicated it even to those in the same house."

It has been doubted whether, in the correct sense of the term, a predisposing cause can be said to exist in reference to a specific form of disease. The doubt is, however, without any other foundation than the notion formerly combated, that all such maladies must necessarily arise from a single and exclusive source. In every climate and locality of which yellow fever is endemic, it is perfectly well known that strangers are more liable to it than natives and old residents. In the West India towns and those in the Gulf of Mexico, and in South America, the immunity of natives is, I believe, complete. In Charleston, S. C., it is very nearly so, and yellow fever is familiarly called "the strangers' fever." Yet it occasionally, though very rarely, assails an adult native, if he has in any degree estranged himself by travel or prolonged absence. Length of residence gives protection relatively to the complete acclimation of the subjects—some of whom have been attacked after several years' domiciliation. Children are also liable, in an undefined degree, between the ages of two and sixteen or eighteen;

some individuals and some families remaining, as is affirmed, longer in this condition of immature acclimation than others.

This privilege or protection, belonging to the inhabitants of frequently invaded or endemic localities of yellow fever, does not exist in the places which it visits occasionally, and at distant intervals. The population of New York, Philadelphia, or Boston, of Cadiz, Gibraltar, or Seville, are all equally liable to its attack when once it appears in the midst of them. These are remarkable facts, hitherto very imperfectly and unsatisfactorily accounted for. There can be no question, that in the very great infrequency of second attacks affecting the same individual, yellow fever bears strong analogy to the known contagious diseases, smallpox, measles, etc. If this immunity is not perfect, it is nearly so; and, we may venture to affirm, that any person having been once assailed by yellow fever, will not have it again in any of its endemial seats, provided he remain there a constant resident. There is much dispute whether a Gibraltar or New York attack will save a man from a second in Havana or Vera Cruz, or even in a subsequent epidemic visitation after a long interval. I believe the security in the latter cases less perfect, but I cannot help regarding it as still very notable, and fully proved.

The nature of the protection derived from acclimation is not known. The fact is not denied, and goes to confirm the doctrine so clearly established of the characteristic specialty of this disease, and its wide separation from intermittents and remittents, against which no acclimation defends. On the contrary, malarious fevers leave behind them a well-known predisposition to succeeding attacks. Farther, a subject of previous remittent or intermittent is more liable, if re-exposed to their causes after a short, than a long interval of health; in both these respects a marked contrast is presented between these types of fever.

While treating of this topic of predisposition, it deserves to be noted that negroes are less liable to yellow fever than the white race. R. Jackson affirms that no negro immediately from the coast of Africa has ever been attacked with it in Jamaica.

Lining, writing at a time when there were very few negroes here, except Africans, tells us he "never saw or heard of an instance among them." On the other hand, Rush says that blacks were affected by it in Philadelphia in 1793, in common with the whites, but that "it was lighter in them than in the whites, although many of them died with it." Musgrave declares that in Antigua, in 1816, it extended promiscuously over both blacks and whites; and Perlee gives the same statement of its prevalence in Natchez, Mississippi, in 1819. I have never seen an African negro attacked with it. But I have met with several well-marked cases among "country-born" blacks, though they appear to me much less liable to take it, and, as Rush says, they have it more lightly. In both these respects, mulattoes occupy an intermediate position.

The predisposition of the various tribes and races of white men differs relatively to their national and individual temperament. The Englishman, Irishman, Scotchman, German, New Englander, and Western man, stand in the order of liability as I have arranged them.

Far beneath them are the Frenchman and the Spaniard. In proportional mortality they may be differently ranked; the Irishman and the German are far above the rest, the Frenchman and Spaniard again stand lowest on the catalogue.

The *exciting causes* of yellow fever offer nothing peculiar in the enumeration, but include all those circumstances adapted to the production of fever of other types. Exposure to the heat of the sun by day, to the dampness of our chill dews by night; fatigue; excesses of all kinds, but above everything else, intemperance in drinking.

A foreigner who desires to avoid so rough and dangerous a seasoning as this cruel disease will afford him, or at any rate to diminish as far as possible its violence, will select his lodgings in an open and dry situation; sleeping in a chamber well ventilated, and elevated two or three stories from the ground. He must remain under shelter and at rest during the heat of the day, and shun all exposures to night dews or rain. He must be strictly uniform and temperate in all things. Low diet, bleeding, and purgatives, are injurious rather than salutary, as tending to reduce the system below the point of healthy action, and diminishing the elastic capacity for resistance to noxious agencies. A mercurial course, formerly fashionable as a prophylactic, is now seldom thought of. It is entirely useless, and worse.

The *symptoms* with which this malignant disease makes its invasion are somewhat irregular, varying in the different cases with the circumstances of constitution, season, and locality. It might be useful but would not be easy to distinguish them, as has been attempted, into the peculiar or characteristic, and the common, or such as occur in other autumnal fevers. These latter, indeed, predominate so entirely at the beginning of the attack, that any physician, however great his intelligence and experience, may be deceived if he fix his attention exclusively upon them. We must duly consider the endemic or epidemic constitution of the place and of the time, and the predispositions of the subject in reference thereto, according to the advice of the sagacious Sydenham, being directed in the formation of our opinion by all the facts.

The paroxysm of yellow fever often commences with a degree of chilliness, though there is not, for the most part, a formed rigor; to this, soon succeed heat and dryness of skin, with uneasiness at stomach and pains in the head, back, and limbs. The patient is anxious, alarmed, and restless; his face is flushed; his eye muddy, red, and suffused, as though he were about to shed tears—a state of the organ well described by Robert Jackson, as closely resembling that produced by exposure to the smoke of green wood; it shuns the light, and its motions are painful. The headache is often intensely violent, affecting the forehead chiefly, and persisting throughout the attack; in some cases there is confusion of thought or delirium, or even furious mania from the first. The spinal aching is sometimes intolerable. The pains in the limbs are usually severe, and are seated both in the joints and in the muscular parts, the calf of the leg especially. The stomach, which truly seems to be, in the language of Rush, "the throne of the disease," is almost uniformly distressed and irritated, and vomiting comes on spontaneously, or is easily excited by anything taken. Its contents are thrown up, then bile, perhaps, and afterwards large quantities of a thin mucous fluid, variously colored. While retching, the patient suffers much from soreness and pain, he shrinks from pressure applied to the epigastrium, and complains of a burning heat at that point, combined with a feeling of weight and hardness. The respiration is sometimes hurried, embarrassed, and irregular; at others, slow and labored, with deep, and heavy sighs, and great oppression about the præcordia.

The skin is generally dry, and harsh, and hot, causing in the fingers applied to it, a pungent sensation, peculiar at least in degree. The yellow hue, so familiarly referred to, first tinges the eye, then the forehead, neck, breast, arms, and body. Sometimes it is not noticeable until the very last stage, and occasionally does not show itself at all. It differs very obviously, I think, from the sallowness of protracted remittents, and of jaundice, being darker and deeper, between an orange and a bronze color. The pulse is less to be trusted here than in ordinary fevers, and, indeed, in a notable proportion of instances, exhibits little or no correspondence with the state of the general system. In the more common cases, it is frequent, hard, voluminous, tense, bounding, quick or jerking, and irregular.

The tongue is at first soft, swollen, so as to show the indentations of the teeth, and becomes soon very red at the point and edges. The thirst is usually described as excessive, and unceasingly urgent. Ice, and cool drinks are, indeed, desired vehemently by the patient, as much, I think, on account of the relief they afford to the heat of the burning stomach as for thirst, a distinction noted by Lining long ago, who says, "very few complained of thirst, though they had a great desire for cold liquids." The bowels are torpid, responding slowly to the most active cathartics; stools, when procured, are often, from the first, dark colored and acrid. I have seen one case commence with diarrhœa. Albuminuria is affirmed to be of common occurrence; it is not constant, however.

The countenance is, in all malignant disorders, marked and striking in its expression. In yellow fever, it has been thought sufficiently peculiar, to denote unequivocally and at first glance, the character of the attack. The aspect is distressed, gloomy, and impatient, the face flushed and turgid, the eye red and watery; there is withal a singular wildness and fierceness of the visage, resembling somewhat that of intoxication, combined with sadness and terror.

These symptoms constitute what has been called the first stage of the disease, following the division recognized so commonly by writers into three stadia or periods. Its duration varies much in the several cases, and is determined by circumstances not easily pointed out. In this stage is comprised the whole of the febrile excitement which essentially belongs to the attack. I have seen it pass over in four hours, and last between sixty and seventy, the average being probably not far from thirty-six to forty-eight.

The second stage commences with an abatement of many of the preceding symptoms, and has hence been improperly considered a state of remission. If the word is meant simply, as in other instances, to refer to a diminution of febrile excitement, it is very ill-applied to an apyrexia confessedly total—a complete intermission—"a stadium," says Lining, "without any fever."

The headache is now relieved; the pains in the back and limbs subside or disappear; the skin is more pliable, cooler, and moister; the pulse is nearly natural, perhaps a little more frequent and softer than in health; the breathing is easier; the pain and burning of the stomach lessened, its irritability not so urgent, and the act of vomiting attended with less effort; the face is less flushed, the eye less red and suffused, and on the adnata a yellow tinge is gradually substituted. The well known orange hue overspreads the surface; it is erroneously confounded with jaundice by many writers. I regard it rather as owing to a depraved condition of the blood itself, and to a weak and morbid state of the capillary circulation. It has been seen pervading the cellular substance throughout and in the periosteum; but this I have not met with.

The stadium thus characterized, lasts but for a few hours—never longer, I think, than from twenty-four to thirty-six, perhaps usually about twelve to eighteen; when the disease, if not subdued or controlled, develops a violence and rapidity of progress infinitely disproportioned to the enfeebled powers of resistance in the constitution.

Of this third and last stage, the prominent feature is the collapse, as it has been called—the extreme prostration of the subject. His pulse sinks, is quick, unequal, depressed. The skin grows dark, and assumes a mahogany or bronze hue, especially on the face and hands; the discoloration of which may be removed by pressure, and a paleness substituted, disappearing slowly when the finger is taken off. The tongue sometimes continues whitish, soft, swollen, and moist on the sides, with a dark brown, dry streak in the centre; it often becomes dryish and of a fiery red, and smooth, with fissures perhaps oozing an offensive blood. Of the same hue and appearance is the whole lining membrane of the mouth. The stomach is now so irritable that it retains nothing, and the vomiting hitherto attended with some retching and straining, is very easy as well as frequent. Occasionally we observe that the fluid thrown up at this stage consists entirely of colorless mucus, rather tenacious and difficult to be got rid of. This is I suppose what is called in the West Indies "the white vomit," described by Blair as follows: "The white, ropy, acid fluid which is frequently ejected at the close of the second stage in considerable quantities, and with much relief to the symptoms, is generally attended with considerable retching; this is the fluid which, during our epidemic, was called 'premonitory or precursory' fluid, or white vomit." His editor, in a note, says that "in the late endemic in Barbadoes, a fluid answering tolerably to the description in the text, was of not unfrequent occurrence, though not so frequent as to arrest attention." Davy thinks it serous or albuminous.

About this time a number of variable phenomena present themselves, which belong to the history rather of individual cases than of the average course of the disease. Different epidemics are characterized by material variations in this respect. In 1824, the tendency to hemorrhage was most generally exhibited, and at this point of time even the cases which seemed improving, and promised a favorable termination, showed some epistaxis, or oozing from the gums or mouth. In 1852, there was what I was inclined to call a scorbutic diathesis. The gums became livid and soft and spongy; the mouth was filled with saliva of an offensive odor, and the aspect of the patient was very similar to that of one laboring under mercurial ptyalism. In some of the cases, I found it very difficult to satisfy myself that no mercury had been taken. In others, without any such effusion into the mouth, the parotid and sub-maxillary glands were enormously swollen. I saw, with Prof. Frost, a patient whose death he attributed to difficulty of deglutition and breathing from these tumors, having thought him in a way to recover before they supervened. Petechiæ and vibices—sometimes large ecchymoses—showed themselves. Eruptions have been often spoken of as belonging to the history of yellow fever. They do occur, but much less frequently than one would infer from the statements. Out of 275 cases admitted to the Roper Hospital between the 2d September and the 1st November, 1852, but 5 were marked with eruptions—and no two of them were alike. One of them looked very much like the efflorescence of measles, and another resembled urticaria. They came out about the termination of the second stage, and their presence was coincident with no observable change or crisis. In some of the worst cases, there was about this period a superficial inflammation of the scrotum in males and of the vulva in females; vesication followed, and the sore exuded an offensive serum and looked gangrenous. Flores mentions having seen such a spot upon the penis of a patient; and ascribes it to the acrid irritation of a drop or two of black vomit, which he says had fallen on the part.

In the early part of this delusive interval or stadium—too often, indeed, delusive—the patient is cheerful and hopeful; but if the disease progresses, he soon becomes conscious of his actual condition, and his countenance betrays great anxiety. The mind is often clear and calm, however. The stomach grows more and more irritable. The mucus and fluids thrown up are now found to contain flakes of a dark color, the proportion of which increases, until they come to resemble a mixture of soot or coffee-grounds in water. This is the *black vomit*, a justly dreaded and terrible symptom. The amount ejected is often astonishing. It escapes sometimes in the act of hiccuping, and occasionally spouts forth from the mouth with some force, involuntarily, as the patient lies on his back. The contractile power of the stomach, on the other hand, ceases entirely in some cases to act, and there is no vomiting; the belly is distended, and a loud gurgling is produced by every movement of the body. The bowels, so reluctant at first, may now yield; the alvine discharges becoming frequent and abundant, consisting often of a fluid identical with the black vomit. The powers of life rapidly decline; breathing is laborious, with deep sighing and moaning, and intolerable oppression and distress about the præcordia and the epigastric region. The skin is cold and clammy; the eyes

nd hollow; the tongue black and tremulous; there is low mut-
g delirium. Hemorrhage ensues in a considerable proportion of
the blood exuding from the gums, tongue, fauces, nostrils, sto-
intestines, urethra, eyes, and ears; and death finally relieves the
able patient from sufferings dreadful to contemplate.

ch as I have above described, are the usual phenomena of yellow
. In the great majority of instances, it puts on among us the
res of open inflammatory excitement, yet the deviations from this
lar history and progress are by no means unfrequent, and offer to
res of strange and almost unaccountable diversity.

other fevers, it often assumes a congestive disposition, the
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affected in cases of this kind. e head being the centre of de-
ination, lethargy, stupor, or co nay supervene, or death ensue
w hours, preceded by frigh nvulsions. The lungs are oc-
lly attacked with great oppression and dyspnœa. The stomach
g assailed, the symptoms are e edingly similar to, or indeed
tical with those which follow lministration of the more in-
poisons, such as arsenic; all regularity of febrile progress being
the overwhelming derangemen of this most important organ
s extensive sympathies.

ly and irretrievable collapse, wit abundant black vomit, are the
attendants. The cases are almo uniformly marked by a pecu-
bronzed or dark mahogany discoloration of the skin, ascribed to
the sluggish or suspended action of the extreme vessels of the capillary system; visible on the surface, inferable as present everywhere. It is one of the worst symptoms, and is attended by many circumstances all portending great danger. The patient usually utters little complaint, though the countenance, which is often listless, unmeaning, and apathetic, occasionally assumes an indescribable expression of anguish and horror. All the susceptibilities seem blunted; the stomach is not tender on pressure, or obscurely so; the bowels are insensible to purgatives or enemata; the skin becomes pale under pressure applied, slowly resuming its dark hue; sinapisms or blisters laid upon it are unnoticed, and if they produce inflammation, the parts are apt to become black and sphacelate. I have seen this occur as long as five days before death, though such malignant attacks generally terminate on the third, fourth, or fifth day.

It would be vain, if not useless, to attempt a detail of the many varied forms assumed by this pestilence at different times and in different localities. They are rather to be regarded as interesting pathological curiosities, than as forming definite classes. Among them, we may note what Rush used to call the "walk about cases," in which the patients scarcely feel or acknowledge they are ill; refuse to lie down, and are unwilling to be prescribed for; but, with hardly an exception, sink and die promptly.

The *duration* of yellow fever differs relatively to the form it puts on. Congestive attacks terminate early, say on the third and fifth days. The ordinary inflammatory cases die on the fifth, sixth, and so on to the ninth. In extreme instances, death may take place in a few hours, on the one hand, and on the other, a typhoid condition may be protracted, as I have known, to the nineteenth, twenty-first, and twenty-fifth day. Recoveries are in general slow; the tedious and lingering convalescence is apt to be harassed by the formation of abscesses on the body and limbs, which suppurate unkindly.

Relapses are rare, or rather unknown; indeed, few affirm their occurrence. Of second attacks, I have already spoken, and am prepared to maintain, that although some well attested instances are recorded, yet the immunity is very nearly complete; and that this may be fairly alleged as one of the characteristics of the disease under discussion.

Prognosis.—Yellow fever must be viewed as one of the most destructive forms of pestilence, exceeding even the plague, perhaps, in proportional mortality. In 1804, in Gibraltar, out of a population of nine thousand civilians, but twenty-eight persons escaped an attack, and the deaths amounted to more than one in three. Musgrave gives a scarcely less terrible account of it in Antigua, in 1816. In Jamaica, under the care of Dr. Hume, three out of four died of it. In the city of Philadelphia, in 1820, there died eighty-three out of one hundred and twenty-five—about two out of three. In the same year, according to official returns, the loss in Spain, at Xeres de la Frontera, was seventy per cent., nearly three out of four. In Philadelphia, in 1853, there occurred 170 cases between July 18th and October 18th (81 days), of which number 128 died, about seventy-five per cent. Blair calculates the mortality of untreated cases at twenty-nine per cent. in Demerara and British Guiana; of all cases, treated, at 13.3 per cent. The difference of proportional mortality in different seasons is very great. In a table given by Davy, from the military hospital at Barbadoes, it is set down for 1841 at 83.33—for 1842 at 17.91.

Sir James Fellows tells us that, during the fever of Cadiz in 1800, the "air became so vitiated that its noxious qualities affected even animals; canary birds died with blood issuing from their bills, and in all the neighboring towns which had been infested, no sparrow ever appeared." Rush says that cats died in great numbers in the streets of Philadelphia, from the pestilential state of the atmosphere. Perlee affirms that about Natchez, in 1819, "not only domestic animals, but even the wild deer of the forests shared the influence of the epidemic constitution of the air."

In Charleston the proportional mortality has differed in different seasons by a very wide range; in 1817 and 1824, it was very great; much less in 1819 and 1827; in 1852, very little. Considered extensively, it will not average more, I think, than 10 to 13 per cent. In 1854, it did not exceed, as well as can be calculated, 3 per cent. of the sick.

The individual prognosis is much modified by circumstances. The attack is apt to be violent, and its progress hasty, in the sanguineous and plethoric. For the intemperate there is almost no hope. National habits and modes of life have a decided influence. The Irish, Germans, and Scotch afford the worst cases; Spaniards, Italians, and

Frenchmen are very apt to recover. Midway stands the Englishman, the Northerner, and the Mountaineer, or inhabitant of our interior country. Generally speaking, the more recently a stranger has arrived, the more severe his attack. Among the young children assailed, the ravages of this pestilence are very great everywhere.

In ordinary inflammatory cases, the condition of the stomach is of paramount importance; everything depends upon its powers of retention and its tranquillity. Constant nausea and retching, especially if attended with burning at the epigastrium, and notable tenderness on pressure, give a gloomy prospect. The pulse is not generally to be much depended on; it denotes danger if it become small, quick, and irregular. A skin moist and relaxed is unfavorable; so says Rush, and truly. This symptom was observed more frequently in the epidemic of 1838 than in any other. In bad cases, the febrile paroxysm, the first stadium, is usually short; yet I saw a patient recover in whom it had lasted no more than four hours. After the subsidence of this original paroxysm, we are pleased with the supervention of any degree or form of febrile excitement. This indeed has been properly spoken of by Robert Jackson, as "a new stream of life." At this crisis, there is every reason, even in attacks of ordinary severity, to dread a sudden collapse or a gradual sinking of the strength; and it is at this point of time, and under these circumstances of exhaustion, that the black vomit makes its appearance. An unnatural calm and stagnation are substituted for the unquiet agitation which has shaken the patient; from which it is difficult to arouse him by any therapeutical measures. Any irritation which shall excite him, any determination to whatever organ, besides that one which has suffered most from the commencement, will at least protract his fate, and lengthen out his chances for recovery. Hence, even a typhoid heat of skin, and stupor, and muttering delirium, are better than a tranquil indifference; nay, I have seen a quasi phrenitis develop itself more than once, and with favorable results. The stomach is the most vulnerable point, and a division of the force of the assault is apt to be attended with consequences less promptly fatal than its concentration. Hence, also, strangury produced by epispastics, or the internal exhibition of cantharides, is generally recognized as a good symptom; I have, however, lost one patient in whom it had been brought on.

We must not confound this with the spontaneous suppression of urine sometimes met with; the defect of renal secretion. This is almost uniformly a fatal sign here, as in cholera. It has happened to me to see two recoveries from it, nevertheless; and in one strange case it lasted five days, and then the secretion was resumed, but after many reverses, and a long protracted illness, the patient died. In such suppression, there is no pain nor distension of the bladder, and the catheter carefully introduced brings away no fluid from it. So far as I have observed, the appearances on the skin, known as petechiæ, vibices, etc., are forerunners of death. There are recoveries, however, recorded after them. I would say the same of the dissolved condition of the blood—gory, diffluent. Yet Rush affirms that they were removed by venesection, when it had been indicated by the continued tension of the pulse! a contingency which I should not have hesitated to pronounce incompatible and impossible—and that sizy blood had succeeded to that which was dissolved!

As regards the black vomit, the prognosis is always unfavorable whenever it occurs in yellow fever, whatever may be the condition of the patient in other respects. I do not affirm it, as some have done, a mortal sign, for I have seen several exceptions to the rule, but it is a rule, notwithstanding. Concerning the nature of this phenomenon, so much has been said and written, that it deserves a moment's attention from us. The black vomit consists of dark flakes, specks, or small masses diffused more or less thickly in a lighter-colored fluid. I have seen the same matter passed downwards in a pasty state, forming a figured or semi-figured stool. Though occurring so familiarly in yellow fever, as to give it a name in one language at least, it is by no means exclusively or specifically a symptom in that disease only, and of course cannot be regarded as a diagnostic. I have myself met with it in several cases of bilious remittent, and in gastritis and enteritis; in one case of varioloid, occurring in winter; in catarrhal fever once, in March; twice in dropsy, and once in the familiar vomiting of pregnancy. It attends puerperal fever occasionally, and always, I believe, follows rupture of the uterus. Dr. P. G. Prioleau, whose professional experience has seldom been equalled, assured me that he had repeatedly known it take place among the easy vomitings of pregnant women, without unpleasant results: and that he once witnessed its spontaneous occurrence in a youth from mere fatigue, ceasing readily, and leaving him quite well. I have said that in yellow fever it usually occurs about the commencement of the second stage, and that it is generally followed by more or less prostration or collapse. The earliest dates that I have recorded of it are the sixteenth, twentieth, and thirtieth hour. In these instances, it was totally unexpected; having been preceded by no symptom of danger, no circumstance that arrested any special attention. The nature of the fluid has been matter of some dispute. It was first thought to be composed of portions of the villous coat of the stomach, dark and gangrenous, thrown off, and macerated in, and mingled with, the dissolved and corrupted contents of that cavity. But as no one could recover after gastric sphacelus, and as this condition was not found in post-mortem examinations, the notion was necessarily abandoned.

It was alleged by some to consist of vitiated bile—black bile, but Physick and Cathrall traced it into the vessels of the mucous tissue of the stomach. It is found in the stomach when the pylorus is closely contracted. It is found abundantly both in the stomach and bowels, while ordinary bile fills the gall-bladder. It is flaky or granulated, and brownish black; the darkest colored bile is tinged with a yellowish or greenish hue, and is smooth, glossy, and homogeneous.

The majority at the present day regard it as a form of gastric hemorrhage. Warren, of Barbadoes, calls it "mortified blood." Bancroft says it is "merely effused blood altered in appearance and darkened in color by the gastric juice, or by some chemical decomposition." But this view is not altogether free from difficulties. The change of appearance is not accounted for, as we know it takes place in the vessels. We never meet with it in acknowledged hematemesis, the blood being always recognizable in that hemorrhage by its proper qualities. Dr. Rhees, of Philadelphia, informs us that, on instituting a series of observations with the solar microscope upon black vomit, he found it to contain innumerable animalculæ. A single drop exhibited many thousands, being indeed a mere congeries of them. When recent fluid was examined, they were alive, and in constant motion; if suffered to stand awhile, and when taken from the dead subject, they were still and torpid. Comparative examinations were made of the discharges from the stomachs of patients ill with bilious remittent and other autumnal fevers, but no similar appearances were detected. A mixture of muriatic acid with blood resembles it pretty closely.

Numerous analyses, minute examinations, and microscopical observations upon this fluid, give us the following results, carefully collated:

When filtered, it passes colorless, leaving the coloring matter on the filter. The specific gravity of the filtered fluid, which contains some mucus, is a little above that of water. It always reddens litmus, and the acid it contains is hydrochloric acid.

The coloring matter presents to the eye the appearance of blood-globules altered chemically or otherwise, and when dried resembles hæmatosin procured from human blood.

Riddell's microscopical observations, very minutely made, detected in the fluid parasitic organisms, granules, algoid forms, torulæ, sarcinæ, melanotic cells, fragments of blood clots, congeries of altered blood corpuscles, abundant epithelial cells, vibriones attached to epithelial cells. Blair says it always contains fragments of lacerated capillary vessels.

The hemorrhagic disposition of which black vomit seems a part, extends over all the surfaces of the body. It affects the œsophagus. I have seen true black vomit matter hawked up and spit out without nausea or vomiting. It is poured out freely from the intestinal tube, from which also we have discharges of pure blood—venous, mostly, and coagulable.

Uterine hemorrhage is a very common symptom, and women will say that their monthly periods have come on prematurely.

Dr. M. Michel informs me that he saw a case in which blood was effused into the ball of the eye, which was destroyed, giving way at the cornea.

Autopsy.—The dead body is usually of a yellow or orange hue. Extensive ecchymosis or subcutaneous effusion of blood is seen in a great many. The blood is always dark; in many it is entirely incoagulable. The heart is often soft and flabby, sometimes exhibiting a yellowish tinge, which is, perhaps, owing to a certain fatty degeneracy. Riddell tells us that the microscope showed "muscular fibres in the heart, in which, from molecular degeneration or disarrangement, all trace of striation has disappeared. This is a lesion, passing to the granular condition, more constant than the fatty degeneration, which, though well marked, is not uniform."

The lungs occasionally, though rarely, exhibit marks of congestion, and even inflammation—being firm, dark, and heavy.

The brain is usually found more or less altered; the vessels are injected, the membranes seem inflamed, and serum, according to McArthur and Ffirth, occasionally effused into the ventricles. The latter, as also Robert Jackson, met with "some cases in which rupture of vessel and effusion of blood had taken place." This is stated to have been often noticed in the New Orleans epidemics. The liver does not present any constant appearances. In some it is soft and flabby, in others engorged with dark blood. I have frequently found it in a natural state, as far as could be judged by the eye, and so say Ffirth and Jackson. Louis and others have laid much stress upon the color, which he describes as pale yellow—*café au lait*, coffee with milk, fawn colored. I remark that many livers do present this hue, well depicted by the above phrases. I have never seen the same appearance of the organ in any other disease. But it is neither uniform nor essential, and cannot be regarded in any sense as diagnostic. It is often wanting. So say the mass of authorities. I have seen the liver of every varied hue and aspect. I have before me at this moment notes of the six last post-mortem examinations of bodies dead of yellow fever, which I attended. One of these was fawn-colored—very characteristic. A second was fawn-colored on the upper surface and of a deep purple on the lower side and around the edges. Two were of dark chocolate-brown, not far from natural, and one was of the hue described by Stewardson as belonging to bilious remittent—olive-colored. The sixth was again of coffee and milk hue. This last was large and heavy. In general this color has been ascribed to anemia of the organ, which is usually light and small. Bache, of Philadelphia, describes the liver of the yellow fever cases of 1853, as presenting fatty degeneration. Riddell, of New Orleans, says the microscope showed cells exhibiting fatty degeneration. The spleen, often enlarged and softened, is sometimes unaltered. I have repeatedly seen it firm and small. Once I met with it smaller than the kidney. The stomach is always reddened and injected on its inner surface; sometimes on its outer surface also. Occasionally it is softened. I have never seen ulceration or sphacelus of any portion of it. The inner mucous lining of the œsophagus and of the duodenum are in similar condition. In hemorrhagic cases, there is bloody infiltration everywhere.

Treatment.—In the treatment of yellow fever of the ordinary inflammatory form, our first and principal indication is obviously the reduction of vascular excitement. We must aim at the accomplishment of this purpose by the most prompt and efficient means, compatible with the ultimate well-being of the patient. A few hours at the very commencement of the attack comprises all the time allowed us for the hopeful application of our remedies, as we have to contend with scarcely any disease in which the vital powers are so soon crushed and overwhelmed beyond the capacity for resistance. The force of morbid determination, too, is chiefly directed upon an organ at once of the utmost importance and of the greatest delicacy—the stomach, whose sympathies involve peculiarly the tone and energy of the whole system.

For the fulfilment of this indication, our profession has, with very wide consent, resorted to the lancet, and the authorities who commend it to us are of the very highest repute. Robert Jackson began the treatment of his cases "by bleeding in such quantities as was judged proper." Rush carried it to a prodigious extent, abstracting from many subjects one hundred to one hundred and fifty, and even two hundred ounces of blood; and writes of it in such terms that we must suppose it to have been with him an absolute *sine qua non*, and unattended with any of the slightest objection or ill consequence. Musgrave tells us that he has "repeatedly taken upwards of forty ounces at one bleeding, with success; and with equal success in several cases renewed the bleeding up to the third and fourth time." Nevertheless, I am compelled to differ from these respectable authorities. I regard venesection as by no means an essential, nay, nor even a general remedy in yellow fever; the results of experience and observation (the true basis of all therapeutical knowledge), are unfavorable to the general or frequent resort to it. Nor is authority wanting in opposition to the weighty names which I have already cited in its favor. "Experience," says Gregory, giving the results of his extensive reading on this disputed point; "experience has proved that though occasionally, it is not generally beneficial."

Perlee declares "that the necessity for venesection did not exist. In some plethoric subjects it was tried, without any good effects, however." Dr. Pinckard, in his history of his own case, mentions his having lost twelve or fourteen ounces of blood at the commencement, and its being followed by extreme debility—"a degree of feebleness most deplorable, and such as it appeared impossible to recover from." Good, like Gregory, impartially collating the testimony adduced, warns us of the dangers attendant upon "the double debility induced by the disease and its remedy, however judiciously it may be had recourse to."

For my own part I prefer to substitute the cold bath, which, if I do not deceive myself, is equally effectual in subduing morbid excitement and controlling irritation, without any positive expenditure of, or subtraction from the vital forces. Relief from the pungent heat of skin, the tormenting thirst, the distressing headache, the pain and irritability of stomach, we will never fail to procure. This relief, it is true, will be partial and transient, but the remedy may be repeated as often as seems requisite, without danger or injury. The termination of the chill, if there be one, when the face becomes flushed and the surface dry and hot, a condition almost characteristic in the degree attending this form of fever, is the moment for affusion. Seat the patient in a convenient vessel, and pour rapidly from some slight elevation upon his head and shoulders and over his naked body, a full, large stream of cold water, continuing it until his face becomes pale or his pulse sinks. In general, the sick man himself will exult in the delightful ease which follows it, and will solicit its frequent repetition. I have never yet seen any unpleasant consequences from it. Even children and timid women reconcile themselves readily to the shock of the affusion, and regard it as pleasurable rather than otherwise. The surface should be rubbed dry, and the patient, on lying down, covered so as to be comfortably warm. A mild glow precedes a free cutaneous transudation, often accompanied by a soft slumber. The return of the pungent cutaneous heat and restless tossing demands the repetition of the bath. Immersion is sometimes preferred, and occasionally we choose to sponge the body, to avoid motion or disturbance. Some wrap the subject in a wet sheet. The contra-indications to the use of the bath are, the great age or debility of the patient, and the rather unfrequent determination to the lungs and bowels shown by dyspnœa and diarrhœa. Nor would I repeat it, if it had induced protracted chilliness or other discomfort.

The emetic—so often prescribed by some practitioners, seems to me obviously forbidden by the pathological condition of the stomach, already irritated—with the vessels on its mucous surface deeply injected with blood, and a strong proclivity to both inflammation and hemorrhage. If the patient is attacked, however, soon after a full meal, of which he cannot disgorge himself, I would administer a proper dose of ipecac or sulph. zinci, as the least evil under the circumstances. Every effort should then be made to restore the quiet of the disturbed organs by cups, or leeches perhaps; always by fomentations and sinapisms, and after a time, by the application of epispastics.

The exhibition of purgatives forms an indispensable part of the treatment, and must be attended to without delay. The bowels are for the most part torpid, and bulky or nauseating formulæ will be instantly rejected. Calomel is, on these accounts, almost universally to be preferred, but it is slow in its effect, and requires to be aided and urged forward. This is best effected by the solution of sulph. magnesiæ. They may be administered alternately, at intervals of two hours, until they act sufficiently. "There is," says Chapman, "a species of medical harmony observable between certain morbid states of the body and their appropriate medicines," a remark whose truth is exemplified in the present instance. The above articles are singularly well fitted for our purpose here; they are better retained than any other, excite the least disgust or unpleasant sensation, and procure abundant secretion and excretion from the alimentary canal gently and promptly. When this is effected, we may lay aside the neutral salt and combine some diaphoretic with our mercurial. When the stomach will bear the pulvis antimonialis of the shops, or the true pulv. jacobi, which is far preferable, it is well adapted. After having formed a predilection for this combination, I was pleased to find it highly commended by O'Halloran, who accompanied Robert Jackson in his visit to Andalusia, in 1820.

When the antimonial nauseates, some other sudorific must be proposed. The "*alkaline diaphoretic*" mixture (p. 252) will often succeed well. The infusion of serpentaria, with, or without the nitrate of potass, is often used. None of these formulæ are worth the risk, however, of irritating the stomach, and if they do this, all should be abandoned. My own reliance, in all urgent and menacing cases, is placed upon the mercurial treatment. The free doses of calomel first given as cathartic, must be persisted in until the patient has become definitely better, or ptyalism is brought on. It is a matter of great importance that this should be accomplished speedily, in order to arrest the destructive and rapid progress of this terribly malignant disease. Many and various are the measures proposed, with a view to hasten the excitement of the mercurial action in the system. Some rely on opium, as checking its purgative effects; some regard alkalies as specifically adiuvant. I am convinced that we shall succeed best by a judicious ention to the general symptoms. By the cathartic and the cold h; affusions upon the vertex, and cups or mustard poultices upon epigastrium, we relieve morbid local determination, and dimi- diffused excitement, relaxing cutaneous constriction, deriving to extensive surface of the intestines whose vessels, congested and gorged, are unloaded by solicit e mucous discharges.

Let me repeat, that in emplo the word ptyalism, I do not end or imagine the mere affe of the salivary glands, or the reased secretion of their fluid, in itself of any special import- e towards the cure hoped for. thus only, that we are able to ertain or point out that state, hich ptyalism is the sign or en; when the subject is said be "mercurialized," and the ous organs or tissues imbued wi , and under the dominion of excellent remedy. How univer this is in extent, prevailing the whole capillary system of v els, or at any rate that division hem which is engaged in secr is easily shown. As soon as flow of saliva is thus increased dry tongue becomes moist and soft; the harsh, hot skin is relaxed, and covered with perspiration; the stools begin to be mixed with bile; slight fever, if absent before, is again lighted up; and some emaciation is soon perceived. Let us add the so-much-talked-of ulceration of the gums, and cheeks, and tongue, and we have a fair picture of the morbid condition which it is proposed to substitute for that which constitutes yellow fever.

As to the actual efficiency of this course, I am prepared to speak with confidence. In the whole of the practice in yellow fever which I have seen, I have not noted, nor do I recollect a single case, in which ptyalism was induced during the continuance of the first stadium or febrile paroxysm, which terminated fatally. Nor are examples wanting of an abrupt check being given by this means, to the progress of the disease, after it had advanced into the second stage, new life being thus aroused in the prostrate constitution.

Rush did not confine himself to his favorite remedy—*venesection*, but depended equally upon his well-known doses of "X and X"—"calomel and jalap." He mentions their "affecting the mouth," and tells us that "he lost only one patient in whom this occurred." "Salivation," he says, "was a trifling evil compared with the benefit derived from it." Clark, treating of the good effect of mercury in dysentery, declares himself "thoroughly persuaded that it is possessed of powers to remove inflammation and ulceration of the intestines." We know the stomach and duodenum here to be always inflamed. Annesly contends that it is a direct sedative to the inflamed mucous digestive membrane. Beaumont always found it render this surface pale, when morbidly reddened in St. Martin. Dr. Wade tells us, that in 1791, in Bengal, he "did not lose a single patient in whom the mercury affected the salivary glands." Dr. Chisholm, of Grenada, affirms, unhesitatingly, "when ptyalism comes on, all the alarming symptoms disappear." "Long experience has convinced me that the safety of the patient depends on the excitement of a new action." "In forming a favorable prognosis, I was chiefly, perhaps always, directed by the supervention of mercurial action on the gums and salivary glands. Many instances have occurred to me which have taught me not to despair while the most distant hopes remained of accomplishing that." Jackson, who saw yellow fever in almost every region invaded by it, and in almost every form which it assumes, holds the same language. O'Halloran describes the success of this treatment in Spain. Dr. James Johnson, in reviewing their report, confirms its truth, and trusts, as they do, mainly to the mercurial. Wilson confides in the same practice. I will only add to this "cloud of witnesses," the names of Potter, of Baltimore, and Perlee, of Natchez, who pronounce themselves strongly in favor of the views thus laid down.

In the report on yellow fever from the Guiana Medical Society, we find this statement: "The most successful plan of treatment was the administration of calomel 20 grains, with sulph. quinine 24 grains, followed by a dose of castor oil in four hours; the calomel and quinine repeated every six hours."

Blair says that "if a physician prescribed, within a few hours after the development of the disease, 20 grains of calomel and 24 grains of quinine, and in six hours followed it by a dose of castor oil, he would, in perhaps nine out of ten cases, immediately arrest the disease. If it did not yield to the first dose, this was to be repeated every six hours during the first stage as long as there was no contra-indication. Very early in the first stage, this plan might be designated a specific. I never had occasion to prescribe more than six such doses. I never saw ptyalism follow."

The Guiana Society also say: "We are of opinion that the quinine does act specifically on the yellow fever poison."

The "abortive treatment" by *quinine* is much trusted to in our own country, and several physicians of New Orleans, of the highest authority and widest experience, Harrison and Hunt among them, extol it greatly. The dose given is about a scruple, early in the attack. The haustus quiniæ of the large Charity Hospital consists of 20 grains quiniæ and 40 drops of laudanum. Prof. Hunt is quoted in the *N. O. Hosp. Gaz.*, March 1, as affirming the marked proportional success of this method, not more than one death in twenty cases occurring, if it be commenced within the first twenty-four hours of the attack.

Cinchona has been used largely by the physicians both of the West Indies and Spain; but it is offensive to the irritable stomach, and we are fortunate in possessing its febrifuge principle in modern times in so concentrated and manageable a form. The testimony in its favor is accumulating; yet the voice of the profession on the subject is not unanimous. Davy says that "the treatment by quinine was tried extensively in Barbadoes, but, I regret to state, not with like success;" and many in our own country report failures with it. I have never yet seen any striking advantage gained with it. Some of my friends employed it here in 1852 and 1854, and were pleased with the result; but it ought to be remembered that these were years of very mild epidemics, and that all treatment was attended with very small proportional mortality.

The muriated tincture of iron has been proposed recently as a specific in the treatment of yellow fever. Dr. Wildman, of Savannah, who introduced it, writes concerning it in the following strong terms: "I have treated over 150 cases of yellow fever since the 21st ult. (date of paper, September, 1854), and of that number not one has died who commenced with this remedy prior to the black vomit. I have not administered five doses of any other edicine. I give the muriated tincture of iron in doses varying from wenty (20) to sixty (60) drops every two hours, in a tablespoonful of ater for adults and smaller doses children. The cure is generally erfected in three days. This preparation of iron acts by medica he blood, and exerting styptic alities upon the coats of the s ach." Dr. Harris and others ogized this method. Both Drs. dman and Harris fell victims he epidemic soon after.

he veratrum viride and the num sempervirens have been troduced into the practice of ever by Drs. Ford and White, of Charleston. They employ the tinct res of these powerful sedatives in such doses and at such intervals as to reduce the force and frequency of cardiac action, and bring down the pulse to its natural standard, or near it. They report their success as highly gratifying. They have not, however, proposed this "Bradycrote treatment" as exclusive, but as an efficient and valuable addition to our resources.

I must not dismiss this part of my subject, without a particular reference to the cases occurring in young children. At this early age, there is both difficulty and special danger in the attempt to induce in the system the mercurial action. Whatever may be the cause of the peculiarity, experience proves that it is almost impossible to effect in them the alterative influences of our remedy as shown usually by salivation; and the effort, if persisted in, has been known to end in the most unhappy results; the gums, cheeks, and tongue inflaming, becoming dry and gangrenous, and sloughing at last, with every attendant detail of annoyance and agony. And it is to this peculiar condition of constitution in children, that forbids or contravenes the beneficial agency of our most powerful remedy, that I would ascribe, at least in part, the very great ratio of mortality among them.

There is no reason, however, for abstaining from the exhibition of calomel as the best of our purgatives, in the first instance; but we must soon desist from it, substituting ol ricini, or some combination of resinous and saline quality, as the mixture of sal epsom, with rhubarb and an aromatic. The infus. serpentariæ, or if the stomach be unquiet, the alkaline diaphoretic, may be given; while the cold bath is employed in the mode indicated, and the epigastric region fomented or blistered, as need may require. The stomach being soothed, the general irritability and restlessness of the little patient are subdued, and he sleeps tranquilly, while his skin is covered with a soft moisture. If the symptoms continue urgent, it will often be best to persevere with the administration of our mercurial, in small doses, watching cautiously the least appearance of ill effect from it.

The acetate of lead was introduced into the practice in yellow fever by the late Dr. Mathew Irvine, a most sagacious and acute physician, author of a brief but valuable treatise on the disease. He employed it from the very commencement of the attack, either alone or in union with such other remedies as might be indicated, and regarded it as endowed with singularly beneficial influences in diminishing the inflammatory excitement of the gastric mucous surface, checking its morbid secretions, subduing its irritability, and thus restraining the frequent retchings and violent vomitings; and finally, as a "sub-tonic," endowing with new energy the exhausted and enfeebled organ. O'Halloran declares that he found the acetate of lead serviceable in relieving the irritability of the stomach. He administered it, while pursuing the mercurial treatment, in dilute solution. In a similar manner, and with the same effect, he used a weak solution of sulph. zinci.

This is, indeed, a most distressing symptom, and one which calls loudly for sympathy and alleviation. Not only is it in the highest degree annoying and troublesome to the patient, but by preventing the retention of our medicines, directly destroys all hope from their remedial efficacy, while the strength sinks rapidly under the nausea and violent retching. I have already spoken of the application of cups and leeches in the first instance, a measure unexceptionable, rationally indicated, but less serviceable for the most part than has been hoped for. Counter-irritation must, then, be assiduously persisted in. I prefer the early use of the mustard poultice, covering the whole abdomen; after the febrile stage is past, the vesicatory must be resorted to. Lime-water, with and without milk, new milk alone, olive oil unmingled, the saline draught in the state of effervescence, the carbonate of soda and potass, the vegetable acids—orange, lime, and lemon juice, even the mineral acids, the capsicum pill, creasote, and many other prescriptions are pressed upon us and recommended by excellent authority. Believing, as I do, that the vomiting often results from an irritation of inflammatory character, I abstain from all palliatives of this merely empirical cast. I have derived benefit from the alkaline diaphoretic, and from small doses of opium; there is sometimes relief from ice in pellets, and from the iced soda water of the shops.

The headache is another of these symptoms from which your patient will most earnestly solicit relief; cut off the hair, if thick or long, and pour upon the vertex a stream of cold water from some height, supporting the head over the side of the bed. Let the feet be placed at the same time in a hot and stimulating bath. In the second stage, a blister may be put on the back of the neck or between the shoulders. All these have I seen ineffectual in affording the slightest solace to one whose headache suddenly left him on his becoming salivated.

The management of the *second stage* of yellow fever, the remission of some writers, requires nice attention and assiduous care. We are especially to note the tendency to prostration so apt to develop itself at this juncture in manner and degree unexpected, and betraying the progress of insidious mischief by sudden collapse and black vomit. Cinchona in some mode of preparation will be useful, provided the stomach bear it well.

I prefer the infusion with an aromatic in small quantity, and a little alkali, carb. potass or soda; some choose the ordinary solution of sulph. quinine. Bark, in substance, was in former times given, and in large amount by the West Indian physicians; but few patients are able to retain it. Camphor is very often agreeable and well borne. If a hemorrhagic disposition show itself, by oozing of the gums, or tongue, or sanguineous discoloration of the discharges, the acet. plumbi may be combined with it.

It is here I consider it best adapted—when this alarming symptom makes its appearance early, as occurred not unfrequently in our yellow fever of 1835. I used it with decided advantage in several such cases, though disappointed in its non-fulfilment of the general indications laid down by Irvine, and in the relief from gastric disorder spoken of by O'Halloran. Under similar circumstances I am pleased with the effect of the nit. argenti, which not only exerts evident control over the bleeding surface exposed, rendering the red tongue pale, and checking promptly, especially when aided by pressure, the diapedesis from it, but when given internally, in doses of one-eighth to one-third of a grain, improving the condition of all the discharges. Pledgets dipped in a strong solution of it, being taken into the mouth, stop the hemorrhage there, and enemata of the same solution aid us in arresting the intestinal flux.

Stimulants must now be resorted to, but with caution. Capsicum is one of the safest and best. I object to its exhibition while the febrile excitement continues; but as soon as that has subsided, it may be administered. The pill is its best form, but even that may occasion an unpleasant burning, and require to be desisted from. Opium is often of great benefit at this juncture, and in cases attended with great restlessness and mental dejection, should be prescribed in free doses. It may be combined with almost all the remedies necessary for our purposes, whether stimulating or astringent. After black vomit has come on, the spts. terebinth. has been alleged to be well adapted; I have not, however, seen advantage result from the prescription, and it occasionally irritates the stomach, increasing the sense of heat and burning. Epispastics should be applied over the surface extensively, at intervals of two or three hours, so as to produce as much vascular excitement as possible. The inflammatory irritation which they give rise to in the urinary organs, has been followed with immediate general improvement and ultimate recovery. This may be promoted by the internal use of the tinct. cantharides, which is also stimulating.

Stimulant frictions may also be serviceable. The vegetable acids, vinegar, and lime-juice, mixed with common salt, are rubbed over the body in the West Indies; ardent spirit seems particularly cordial and refreshing—applied with a sponge, its rapid evaporation produces a very pleasant and reviving coolness, while its odor is both grateful and stimulating; it often seems to remove in an instant the very distressing restlessness under which the patient labors, and to substitute for it a certain calmness and tranquillity. So much coveted, indeed, is this sponging, that I have often heard children cry anxiously for it, and adults earnestly entreat its frequent repetition. I have seen them turn over, after being thus gratified, and fall at once into a deep sleep, as if an irresistible opiate had been administered to them.

In the third and last stage of this pestilence, characterized by a dark bronze hue, or the well-known orange color of the skin, extreme debility and abundant discharges of black vomit, I have little to advise, beyond a perseverence in the assiduous employment of stimulants. Of these, the alcoholic are most to be depended on. Wine is rarely well borne, or taken in sufficient quantity. Rum or brandy must be given with no sparing hand: and if their pungency be complained of, it may be sheathed by mixture with milk, as milk-punch, which I often prescribe, or with mucilages, arrowroot, sago, rice, gruel, and the like. Capsicum is much depended on by some practitioners, ammonia by others, turpentine by a few. Some mingle with the fluids taken a proportion of the mineral acids, the nitric, sulphuric or muriatic, which doubtless diminish the fetor exhaling from the body and from the discharges.

The treatment of the congestive form of yellow fever is next to be spoken of, but will require from us only a brief notice. Our task here will be found indeed a difficult one; our patient is from the first moment of invasion in the most imminent danger. These cases are chiefly characterized by deficient or impaired sensibility.

The patient is perhaps chilly, moans uneasily, is feverish and fretful, though dull; when spoken to, he answers in a heavy, indifferent way. The skin may be pungently hot, as in the ordinary or inflammatory modification, but is usually relaxed and of habitual temperature, dry perhaps—perhaps covered with a clammy moisture. The eye is reddened, suffused, and somewhat impatient of light; the arms are often thrown up, and the head rubbed and pressed as if it ached, though, if you ask concerning it, the reply will, for the most part, be in the negative; the mouth and tongue soon become dry, and of a dark fiery redness; in the first instance, the pulse is little altered, it may be somewhat contracted and irregular, sometimes frequent, sometimes otherwise. The disease advancing with quick and steady step, the patient sinks into stupor and coma; the pulse is full, but very soft, and soon losing its volume, becomes rapid, unequal, undulating. An offensive odor exhales from the body, now of a copper or mahogany hue, black vomit supervenes, and death ensues early.

Under such circumstances as these, it is evident that our practice must be modified so as to adapt it to the varying exigencies that press upon us. The very great prostration occasioned by the vehement impression of the morbid cause of the attack, demands imperatively that we shall at once enter upon the measures best calculated to produce general excitement and promote reaction.

Of these, the hot bath claims decidedly the first place, both in point of time and importance. To effect our purposes, the temperature of the water should be as high as can be borne, say 100° of Fahrenheit at least, and the patient, while immersed in it, rubbed briskly with the hand, a flesh-brush, or roll of flannel. We may make the bath still more stimulant by the addition of common salt, spirits, or mustard. On taking him out, sinapisms, or rather mustard poultices, should be applied extensively to the surface of the patient, the epigastrium especially, and along the spine, the ankles, legs, thighs, and arms.

If he continue, under these applications, still torpid and chilly, though well covered and surrounded with heated bodies, bottles of hot water, bags of heated salt, and the like, I would replace him in the bath, the temperature of which should be raised as high as may be without injury. An active emetic will sometimes succeed in rousing the system from this state torpor. Some prefer the tart. antimon., others ipecac., both of wh require to be given in large quantity, and are therefore not at unlikely to depress the vital rers seriously, if they fail to procure their own expulsion. I avoid m, therefore, choosing some of th icker emetics, as the sulphate inc or the sulphate of copper, or more stimulating, such as salt mustard, which seem especially lapted here, and will operate nptly and impressively. Stimul ing enemata, too, should be inistered without delay; the sol n of table salt, the turpentine lsion, or ardent spirits, properly ted, may be employed.

is, I imagine (for the particu contingencies have not been rly defined), in this class of cases at the enormous doses of sulte of quinine to which such important influence has been attributed—it is, I suppose, in these congestive cases, that these quantities of sulph. of quinine have been prescribed with so much benefit; 20, 30, and even 50 grains, we are told, have been taken at once with satisfactory results.

We are not, however, to neglect the diffusible stimulants, which must be freely exhibited. The spts. of turpentine will be found, at this juncture, it is affirmed, an invaluable remedy; where full doses are used, it is said to be doubly serviceable, as inducing a safe cathartic operation on the bowels, while it excites the system most agreeably and quickly. Camphor, carb. ammoniæ, wine, capsicum, and ardent spirits must be taken alternately and combined, and in such modes of preparation as may suit the caprices of a stolid or wilful subject, and remain best on his irritable stomach.

I have found opium one of my most available excitants; but it must be administered boldly, and its effects kept up by repetition. I was led to its use by the obvious analogy which, in one case, I found to exist between the actual condition of the patient, and that with which I was so familiar in delirium tremens. This patient, a gentleman of the most correct habits—temperate and studious—lay feeble and almost unconscious, trembling and muttering, and moaning, while the blood oozed constantly from his mouth and nostrils. He was restless, sleepless, and highly incoherent; he took opium, in three grain doses, at an interval of two hours, for some time, while his strength was supported by the infus. cinchonæ with mucilages and brandy. He recovered.

It is scarcely necessary to say that, in the meanwhile, the mercurial should be introduced as rapidly into the system as may be, alone or in combination with the formulæ above advised, and externally by friction, and as a dressing to the blisters which should be substituted for the sinapisms applied at first. As affirmed by Armstrong, so I also have seen all the peculiar symptoms of congestion subside upon the earliest token of the mercurial affection; the weak pulse become fuller and regular; the cold, harsh skin, covered with a genial moisture; the dry tongue softened, and the incoherent wandering cease; and the whole desperate condition of the sufferer improved into an absolute convalescence.

The recovery from such a pestilential malady as we have been considering, must, of necessity, be slow and tedious, and more or less irregular. The diet must, for a good while, be mild and light, consisting of the vegetable mucilages, after which, milk and eggs may be allowed, and a gradual return to former habits permitted.

A few words in conclusion. The life of the patient depends upon the treatment of the early stage—the febrile or first stadium of his disorder. Yet, however he may sink, no matter into what seemingly hopeless state of prostration, we are never to desert him. Such strange and unlooked for recoveries from the most desperate circumstances, are recorded in our histories of this disease, that a proper regard to our own reputation, as well as the conscientious determination to perform our duty to the last, demands that we should persevere in the most assiduous efforts to restore him.

Even when there is no pulse at the wrist, when subsultus tendinum convulses every limb, and at every hiccup the stomach ejects the odious black vomit, we must not remit our earnest exertions.

In all the stages and circumstances of this malady, of whatever form, we must give the sick man fresh air. If his apartment be close and ill-ventilated, he must needs die. The majority of deaths occur on the fourth, fifth, and sixth days; surviving beyond that period, he will either convalesce slowly, or subside into a typhoid sort of condition, in which the system is so torpid as, for the most part, to refuse to respond to any of our remedies. Still we must not despair.

Ardent spirits, capsicum, ether, ammonia, and any other, or all other stimulants, must be given him in succession or combination. I have repeatedly seen the hiccup cease, the vomiting subside, and the strength and vigor of the patient return, under the untiring repetition of these remedies. It is true, that instances of such success are not of every day occurrence; they are sufficiently numerous, however, to prove that a very large proportion of deaths in yellow fever are attributable to exhaustion, rather than to organic lesion; and hence, to urge upon us the necessity of persevering, to the very last moment of existence, in our indefatigable endeavors.

TYPHOUS FEVER.—I employ here the adjective *typhous* in order to comprise under it certain groups of cases, of which it is still disputed whether they are, or are not, identical; whether we are, or are not, called upon to treat of them as absolutely separate and contradistinguished. My own opinions on this subject have been already indicated. While I approve highly of the disposition of modern pathologists to investigate closely, and to draw nice distinctions, I would still observe some caution, and wait until uniform and characteristic differences had been noted, before I would separate in place and name diseases obviously connate and closely allied, as I consider the several varieties of "typhus" to be.

Under the name typhus Cullen includes nearly all the continued fevers of Great Britain, denoting certain modifications by the use of the phrases synochus, synochoid typhus, and typhoid synochus. Similar views have been entertained by British pathologists generally, through Good, Armstrong, and W. Philips, down to Tweedie and Craigie. The majority of them inferentially, Clutterbuck and Southwood Smith formally, account for the variations by reference to intensity.

Among the French, Bretonneau observed a peculiar affection of the intestines to be a general symptom in the continued fever of the continent, and thence applied to it the denomination, dothinenteritis, significant of *intestinal pustulation*. His [illegible]servations were repeated and confirmed by Petit, Cruveilhier, And[illegible]l, Chomel, and Louis; Bally [illegible]ards fever with this complication [illegible]s an "ileo-colitis;" Petit and [illegible]res entitle it "entero-mesenteric" fever; Andral looks on it as an intestinal exanthem, and places it among his ataxo-dynamic fevers. This last writer objects to the appel[illegible]on "typhoid fever," first used by Louis and Chomel, as not sufficiently distinctive; it does not appear that they intended it as a def[illegible]te or specific name, though it has unfortunately become so, and most emphatically in our own country.

Those who protest against our confounding together two maladies characteristically distinct and separate, are bound to show clearly the lines of distinction which divide them from each other. It is undeniable that, as the term imports, typhoid often greatly resembles typhus; we require to be told in what phenomena we shall find them essentially unlike. Are there any symptoms which uniformly belong to the history of either, which do not present themselves, or which present themselves only incidentally or occasionally in the other? Is there any anatomical lesion uniformly displayed in the body, dead after passing through an attack of one of the numerous varieties of these fevers, which is not discovered in autopsies of the other forms?

Both typhus and typhoid are asserted to be contagious, both are regarded as eruptive fevers, both supposed to attack the constitution but once; they arise under common circumstances; they appear often in the same localities: on the other hand, the contagiousness of both has been denied; it is acknowledged that the cutaneous eruption is not constant in either, and so many writers still treat of them under the same name, that we are obliged to apply their remarks and counsels indiscriminately. "It is undeniable," says Campbell (H. F.), "that the two diseases are inseparably bound together in ties of the strongest and most indissoluble, though mysterious affinity; the necessity which any theory may involve of separating them, is enough of itself, to declare its absurdity."

In this country, the authorities preponderate, however, in favor of such separation. Gerhard, Jackson, Bartlett, and Wood, followed by a host of others, have made it, if not actually necessary, yet highly expedient for the sake of being understood, to follow their example. The last named author, in his valuable *Treatise on the Practice of Medicine*, has consistently proposed a significant name to be substituted for a word which conveys either no meaning or an incorrect one, and regarding the intestinal affection as primary and essential, calls it *Enteric Fever*. His description of it, however, is very exactly the same as that of Gerhard, Bartlett, Flint, and Sutton, and corresponds with the typhoid of Louis. In Europe opinions are still divided. The more recent writers of Great Britain, Jenner being the most prominent among them, maintain the specific distinctness of the two varieties of continued fever; and Watson in the last edition of his excellent work, avows an entire change of views on the subject.

The diagnostics chiefly dwelt on, are the appearance of the cutaneous eruption during life, and the peculiar mode of intestinal lesion found post mortem. But there is no class of cognizable cases in which any exanthem is of uniform occurrence. Dr. Wood tells us that "the rose-colored eruption is one of the most characteristic phenomena of enteric fever—but, though present in the great majority of cases, it is not so in all." Chomel, writing of "typhoid affections," says it is wanting about in one-fourth of the whole number of cases. Nor is the intestinal lesion constant any more than the exanthem in any season or any group of cases, or any special form or variety, seeming to be referable rather to locality than to any other condition or circumstance. Lombard states the following facts. In Paris and Geneva, he found this lesion uniform; an essential element of typhus fever; in Glasgow, it occurred no oftener than once in three cases; in Liverpool and Dublin, in a still smaller proportion. In London, Tweedie says it affects not more than one in four, varying with the seasons, and met with most frequently in autumn. Armstrong and Lawrence have seen fatal cases of "simple typhus" with no lesion; Andral recognizes a whole class of ataxo-dynamic fevers "in which no lesion of the digestive tube exists." Dr. Chadwick, of Leeds, declares that in the fever hospital of that town "we find that the ulceration of the mucous surface exists along with the dark-colored rash of *typhus*, or with no rash at all; that the *typhoid* rash occurs in cases where the mucous membrane is not affected; that this condition is not necessarily marked by a diarrhœa; that the two forms of eruption sometimes occur simultaneously in the same case; and that, in every conceivable form, the symptoms, said so strongly to mark the special forms of fever, are mixed together in the same individual."

It must not be imagined that there has been any want of divisions and subdivisions of this large and important class of continued fevers. The old English writers distinguish typhus mitior, nervous fever, from typhus gravior, putrid fever—a reference to the predominance of neurotic or hæmatic derangements; the more recent speak, after Armstrong, of "simple, inflammatory and congestive typhus;" the French and Germans recognize many varieties, designated as "simple, adynaataxic, cerebral, abdominal," &c. We are familiar now with the ses, Irish typhus, true typhus, jail, ship, emigrant, and hospital

n unwilling to carry the controversy any farther, and will add ning to the argument here briefly given and formerly stated when ting of types in fever. Nor can I refuse to admit, that the cases arrange themselves on a large scale in groups resembling each other generally in the prominent symptoms, and requiring similar management. If we subdivide typhous fevers into four such varieties, we e able to recognize natural lines of distinction separating them; simple typhus of Armstrong, mild typhus, the nervous fever of common phraseology; 2. Abdominal typhus, typhoid, or typhoidal fever, typhoid affection, dothinenterite, ileo-colitis, enteric fever; 3. Cerebral typhus, in which coma or stupor is the prominent feature, the tendency to which, indeed, gave name to the whole class; 4. Putrid fever, malignant typhus, jail, hip, and hospital fever. The first two come fairly under the head o typhus mitior, which will include the lighter cases, also, of the third; the fourth is the typhus gravior of Cullen, and the older English writers, and will comprise some the severer instances of the third. All are alike contagious; the t three occur sporadically, and in o linarily healthy situations, and n in country places; the last, demands for its development a foul, l ill-ventilated residence, and the presence of air vitiated in a pecu- manner by animal exhalations, or, what Gregory very appropriately terms Ochlesis—the "crowd poison." The cases are thus modified, probably, by an influence exerted upon the condition of predisposition of the subject, not by any change in the character of the cause, which I regard as the same in nature, differing only in intensity and concentration in all the forms spoken of.

Cases, beginning as simple, nervous, or cerebral, are by mere protraction converted into the abdominal. Each of them, in an ill-ventilated, crowded place, will become "putrid" or malignant. All fevers, indeed, as Hildenbrand maintains, are brought by protraction and confinement in bad, stagnant air, to assume the typhous character.

These observations being premised, I proceed to treat of *typhoid* and *typhus* fever under separate heads, for convenience sake, and in compliance with almost universal American usage, and first, of

1. TYPHOID FEVER—far better and more significantly termed by Prof. Wood, ENTERIC FEVER. It is matter of common remark that this form of disease has become, within the last quarter of a century, vastly more frequent of occurrence in these United States than formerly; in some malarious districts, indeed, in the south and southwest, where it was hardly known thirty years ago, it has now fixed itself tenaciously, and in a few localities has almost superseded the old, well known, and familiar periodical fevers.

It shows itself often sporadically, attacking a single individual, or a few persons at once; it spreads epidemically, too, over considerable districts, assailing whole families; it is not confined to any season, but is more apt to prevail, I think, late in autumn, and through the early winter.

Its invasion is almost always slow and gradual, so that it is difficult for the patient to date its commencement. He is languid and uncomfortable, especially on rising in the morning; his tongue is furred, with an unpleasant taste in the mouth; there is anorexia, sometimes amounting to nausea, and occasionally it begins with vomiting of foul matters. In the majority there is chilliness, or susceptibility to cold air; in a few a formed chill; headache in greater or less degree is almost universally present, with dejection and depression of spirits and sighing. The pulse is frequent and small, but may be tense and chorded; vertigo comes on, and on waking from sleep a light delirium. It is uncertain how long the patient may remain in this state of slight indisposition, for the duration of these mild cases is measured not by days, but by weeks. I have seen more than one person continue to pursue his avocations feebly, but uninterruptedly, for ten days or a fortnight in the circumstances just described. At last a marked aggravation will take place, or a gradually increasing degree of oppression will overcome him. There will be more pronounced heat of skin and excitement of circulation; the headache is severe, and is attended with spinal and muscular pains; there is great thirst, and the bowels suffer griping and irritation, diarrhœa very generally supervening in the second or third week. The sleep is disturbed and the patient seems drowsy, with more or less mental wandering; in some cases, however, the mind continues clear to the very last stage.

An eruption, which has been regarded as characteristic, shows itself in a certain proportion of cases—one-half or three-fourths—usually appearing about the eighth, ninth, or tenth day, rarely earlier, but not unfrequently later, even as late as the twentieth; it consists of minute rose-red spots, circular, very little elevated, growing dim and almost disappearing under pressure. They are chiefly found upon the abdomen and chest, but occasionally spread over the limbs and face. Their duration is uncertain; coming on in succession, they may last a few days or a fortnight. Sudamina also appear upon the skin somewhat later in the case. They are lenticular-shaped vesicles, raised by transparent lymph or serum, easier felt than seen, principally found about the neck and axillæ. I think them of little import, having met with them in all fevers, even ordinary intermittent. Petechiæ show themselves in bad cases towards the termination, consisting of small dark red spots which do not disappear upon pressure—an atom of blood having exuded within the dermoid tissue.

The tongue undergoes changes of appearance worth noting in the progress of the disease. At first, a little pale and sodden and whitish on the surface, it begins after a few days to become reddish, less moist or covered with a sticky mucus; it gradually dries and grows brown along the centre with a dark fur and a deepening hue at the tip and along the edges; finally putting on a fiery aspect, nearly black, thick, dry, glazed looking, and cracking or splitting. The mouth, as well as the tongue and gums, shows a dark crust, which, on the teeth and lips, collects in masses; this sordes is not, as Chomel has suggested, mere inspissated mucus, but an exudation of some of the coloring matter of the blood besides. This crust can be cleaned off, and sometimes peels spontaneously, coming away in flakes, leaving the surface of the tongue, cheeks, and lips smooth, shining, and very red; if the case is improving, the hue gradually becomes less deep and the surface less smooth and glossy; if not, the same black crust is formed again and again to the end. The bowels are irritated and painful in the great majority of cases; towards the end of the second or in the course of the third week, sometimes earlier, diarrhœa comes on with meteorism and tympanites; the stools may not be frequent, but are thin and watery, and come away with much griping and flatulence; they are usually dark-colored and offensive, often looking like a mixture of wood ashes and water or muddy; sometimes they give out no odor; sometimes they are dysenteric or mucous and bloody. The belly is full, tense, and resonant; we very often detect, upon palpation, tenderness fixed in some particular spot; the patient can lie only on one side, or on the back with the knees drawn up. "In a certain proportion of cases," says Bartlett, "generally after the middle period of the disease and sometimes during convalescence, there is a sudden supervention of very acute pain in the abdomen, at first confined to a small space, but extending rapidly over the entire belly. The pain is accompanied by great tenderness on motion or pressure; tympanitic distension; rapid, feeble, and thready pulse; extreme distress; nausea and vomiting; pinched and cadaveric features; and these phenomena are speedily followed by death. These are the signs of an acute peritonitis; the consequence of an intestinal perforation." I have had the misfortune to meet with three such instances of perforation; each of which took place during apparent convalescence, and when the patient was sitting up. Tympanitis is, I think, clearly of two kinds: the first and most familiar consists of mere flatulent distension of the bowels and stomach; this distension is sometimes exceedingly oppressive. I have seen the stomach protruded far upwards under the ribs and sternum, greatly impeding respiration and displacing the heart and interfering with its action. We find some relief from this condition of things in the passage of air from the stomach and bowels. But there is another form of tympanitis which evidently involves pneumatosis of the peritoneal cavity as well as flatulent distension of the bowels; this is attended with greater tenderness on pressure and admits of no relief by escape of flatus. The cause of this pneumatosis or development of air in these cavities is unknown; it is one of the most obscure and uncontrollable of morbid phenomena; not only painful and oppressive, and indicative of a bad state of things, but productive of added risk to the patient; perforation being probably brought on, at least in some instances, by the gaseous distension of the diseased bowel. The respiration is usually somewhat hurried and irregular, but we should be careful to inquire into the condition of the lung in these typhoid affections. An obscure inflammatory congestion of the pulmonary tissue, or the bronchial mucous membrane, is observed to have become more common in the later epidemics and to require some attention. It is shown by cough, with a sonorous or sibilant rale—sometimes, however, humid with expectoration of tenacious and bloody sputa. Delirium is one of the most general symptoms, as has been already stated, but in ordinary cases it is slight and unimportant. It is occasionally wanting. I have just seen a case of great severity and threatening danger, beginning now to convalesce, in which, from the first, the mind has been perfectly clear, and usually cheerful; with the exception of very transient wandering once or twice in the night, and when perhaps half asleep. The mental disorder is usually of the depressed kind, low and muttering, as the phrase is; when strongly marked apt to be attended with great restlessness, tossing, rising from bed, looking about vacantly or inquiringly, unconscious of the place and mistaking the persons near. Picking the bedclothes and catching at imaginary objects in the air, attend the latter stages, when the pulse is failing, the countenance haggard, the eye dim, and hiccup and subsultus agitate the whole frame. The diarrhœa now becomes urgent; stools are passed involuntarily; the urine, sometimes retained, is sometimes suppressed entirely, and sometimes drips away unconsciously; in some, hemorrhage from the bowels, or nostrils, or mouth; in others, coma or convulsions bring on the fatal termination.

The *duration* of enteric fever varies much. Without going into tedious statistical detail, I set it down as on the average about twenty-one days. Fewer cases fall within this limit perhaps than go beyond it. It is sometimes protracted almost indefinitely. Yet this will probably depend upon complications to which it is specially liable. Erysipelas, for example, is very apt to supervene, and is very obstinate and troublesome.

The general *prognosis* is on the whole favorable. The deaths have been calculated as not exceeding, on a large scale, ten to twelve per cent. Yet I was startled at meeting with the following statement in the "*Report on the Sickness and Mortality of the British Army*," by Col. Tulloch and Dr. Balfour: "Under the head of fevers we find—in the United Kingdom—of those attacked there die, in the cavalry, 1 in 3¼; in the foot guards, 1 in 3½; and in the infantry, 1 in 4; which is quite as high as the mortality of the remittent or yellow fever of the West Indies." (*North Brit. Rev.*, August, 1853.)

The special prognosis is inferred to be favorable from the gradual and almost imperceptible improvement generally of the patient; but sometimes a sudden change, a crisis takes place—preceded or not by some marked circumstance, a hemorrhage from the nostril, a free alvine discharge with much flatus, or, most frequently, a long and deep sleep, out of which he wakes cheerful and intelligent. Or the strength fails, the mouth is blackened with sordes, the parotids and submaxillary glands swell, impeding deglutition and respiration too, perhaps; the jactitation and struggling to rise become exhausting, and hiccup or coma precedes dissolution. As to special symptoms, great frequency of pulse is unfavorable. When protracted after the other phenomena are less grave, it may portend phlebitis, as some have thought, or give warning of the supervention of acute tuberculosis. Great emaciation, a haggard visage, a cadaverous smell about the body, indifference and inattention, the eyes or mouth remaining unclosed, bloody or black stools, and spasms or convulsions, indicate great danger.

The sequelæ, or *effects* of typhoid on the constitution, are often of grave import. Gerhard and others dwell on the development of tubercular consumption as the worst of these; some of the European writers speak of the prompt occurrence of acute tuberculosis during seeming convalescence. I have seen paraplegia follow in one case, still remaining after fifteen years; the patient can hobble slowly, supported by two sticks, one in each hand. Impairment of memory for an indefinite length of time affects not a few; two remarkable instances of which are recorded in the cases of the great Italian polyglot, Mezzofanti, who forgot for a while all languages but his own; and that of the Rev. Mr. Tennent, who had to commence his schooling again with the alphabet, on his recovery. e seen several instances less notable.

The *anatomical lesions* of this ave been most closely studied as bearing on the controverted s of its nature and pathology. "There is scarcely a singl of the body," says Professor ood, "in which signs of infla are not sometimes found after eath from enteric fever." The almost always found more or turgid or injected with blo ce met an unexpected clot in of the hemispheres; in som s more or less softening of the tance; in some arachnitis is ; in others more or less effu- within the cranium.

lung is occasionally found ged—"carnified," as Bartlett prefers to call it, being heavy, a m, and tough; containing no air. The heart is usually softened and flabby; the blood is dark and not prompt to coagulate, if it coagulate at all, and much defibrinated. The stomach presents alterations well described by Flint—"On its internal surface," he says, of one case, "it presented several patches of ecchymosis." There was in others, he tells us, "punctated redness—no capilliform redness; the mucous membrane was softened; there were several ulcerations, varying in size and form, superficial, apparently having only penetrated the mucous coat. These appearances were limited to the larger curvature; the organ at this part was easily torn." Chomel found softening, and Louis found ulceration of the stomach.

The small intestines exhibit the lesion alleged as peculiar, characteristic, and diagnostic of this form of fever. This consists in "an affection of the elliptical patches of aggregated mucous follicles in the ileum, denominated the glands of Peyer." These patches become first prominent and thickened; they are elevated somewhat, and beneath, in the submucous cellular tissue, will be found a layer of yellowish white, smooth matter, as firm when cut as cheese. This is the "typhosis" or typhous deposit of Vogel and others. The mucous membrane over this matter becomes reddish with enlargement of the follicular orifices, and at last ulcerates. These ulcers spread along the intestine in succession, sometimes running together, occasionally destroying the muscular coat, and in a certain proportion, as above stated, even perforating the peritoneal tunic. This usually happens in the ileum, near the colon. In one of my own cases, the patient had eaten an orange, and was soon after seized with violent abdominal pain and distension, dying in a few hours. On examination, *post mortem*, I found several pieces of the orange in the peritoneal cavity, which had evidently escaped through an ulcer of about one-third of an inch in diameter, of ragged edges, situated near the ileo-cæcal valve. The solitary mucous follicles, usually, though improperly, alluded to as the glands of Brunner, are often affected in the same manner and ulcerated, and, indeed, ulceration may extend over the whole surface of both the large and small intestines, as we have found that it does to the stomach. Chomel saw a perforating ulcer in the colon. In a protracted case of bilious remittent from Florida, the convalescent patient died of sudden and large hemorrhage from his bowels, and on examination an ulcer was found perforating the coats of a large vein in the colon.

Extensive infiltration of blood in the intestinal tissues is sometimes met with, especially where there have been bloody stools. Watson gives, in his lectures, an interesting history of a female patient, who died from this loss of blood, with so little abdominal suffering, that the hemorrhage had been supposed to be uterine. The small intestine was found in this condition.

The liver undergoes, for the most part, little change. The spleen, on the other hand, is usually found enlarged, softened, and easily broken down.

The kidneys, ureters, and bladder are sometimes found inflamed on the inner surface.

Pathology.—Rokitansky maintains the doctrine of the generation of a typhous poison in the blood—typhosis—which must be got rid of, or thrown off, and its elimination is through the intestines, whence the peculiar deposit and consequent pustulation. The analysis of this typhous matter makes it very nearly identical with tuberculosis and scrofulosis. Many regard typhoid or enteric fever as a true exanthem, but differ as to the surface of eruption. Those who look upon the mucous intestinal tissue as the seat of this elimination, have the advantage of a nearer approach to uniformity, than can be contended for in the cutaneous efflorescence. The typhoid epidemic which prevailed in 1852, in Kentucky, did not present, we are told, the rose-red spots; and the most attentive physician will frequently look for them in vain.

My own view of the whole matter is this. As in the similar conditions of scrofulosis and tuberculosis, a morbid diathesis is generated within the system under the influence, more or less pronounced, of want of ventilation, or of cleanliness, or of contagion—all the agencies that we include under the term ochlesis. The nutrition becomes abnormal; the blood is diseased; the excretory organs, the skin and kidneys especially, failing to perform their functions, a poisonous matter accumulates and is deposited, chiefly about the intestines, upon which the task of depuration is thrown, but also in the mesenteric glands, and often upon the parotids and submaxillaries. These symptoms are not peculiar to, or exclusively met with in typhoid, but may occur in all fevers, if sufficiently protracted. The ulceration may be partly inflammatory, but I prefer to regard it as chiefly the effect of absorption, similar to the ulcerations which affect the cornea and other parts in animals starved to death. If inflammatory in the ordinary degree and manner, they would be productive of a great deal more suffering than we generally observe. Sometimes, indeed, the patient complains of no abdominal pain.

The cause I have said, I believe, to be always the same. Professor Wood tells us "it is often generated when human beings are crowded together, with insufficient and unwholesome food, and a confined and vitiated air. Hence it appears to originate especially in prisons, badly ventilated hospitals, large cities and emigrant ships." But these are the localities and contingencies that produce "true typhus" also, Irish typhus, putrid typhus.

It occurs frequently among persons who come from the country to reside in towns. It invades also the country, villages and farm-houses, and not infrequently appears even as epidemic, in places remarkable for their salubrity. These facts present to my mind no difficulty whatever. Let us consider the strong analogy between typhosis and its [illegible] affections, scrofulosis and tuberculosis—so close, indeed, that we may look upon them as identical vitiations of the system; the first being the acute, the two latter somewhat varied chronic forms of the same morbid condition of constitution. A wild animal caged is, as we know, almost sure to fall into tubercular disease; domestication has rendered all tame animals very liable to it; the progress of [illegible] has been marked by a regularly progressive [illegible] the human race. It shows itself, as does typhosis, [illegible] universally, most intensely, where there is most [illegible] ventilation, most imperfect removal and dilution or [illegible] matters and noxious exhalations given out [illegible] we reflect upon the imperfect manner in [illegible] every where built: how ill ventilated upon any principle [illegible] North for economy and warmth in winter; how [illegible] negro-houses in the South are packed together [illegible] and must be closely shut in in bad weather [illegible] stormy nights: how culpable the inattention [illegible] baths, or ablutions, or to frequent changes [illegible], even among the rich and comparatively [illegible] among the poor, the laboring class, the [illegible] the destitute and paupers, and the inmates of [illegible] we can be at no loss to comprehend the [illegible] cases anywhere, in any locality.

[illegible] as a cause of disease, and mode of propagation [illegible] these typhous fevers, and thus we explain their [illegible] prevalence, the contingencies that produce it in [illegible] having probably acted upon others around him [illegible] infected. That healthy persons may resist a [illegible] and that it requires a certain amount and concentration [illegible] very mischievous, we are well aware. Professor [illegible] states "that in 32 years' experience of fever in that city, it has been ascertained that in fever wards all the attendants contract the disease sooner or later, and that the mortality has been great, not only among those constantly exposed, but also among the more casual visitors, as the physicians. On the other hand, in private domiciles fever seldom spreads; in fact, though he has attended upwards of one hundred medical students who had caught fever in the fever wards, he has never known an instance of its spreading in their lodgings. Such testimony is amply borne out by Drs. Bright, Latham, and Williams, all of whom consider that a few fever patients can without danger be admitted into general wards, while the accumulation of cases in a separate ward endangers all who come into contact with them." The experience of the physicians of New York, which is immense, goes also to establish the same views. Watson makes contagion the exclusive cause of all these fevers.

Treatment.—Those who regard these typhoid affections as in their nature essentially exanthematous, advise us consistently to abstain from all active interference, and prefer to conduct a patient through the attack under mere palliative and expectant management. I do not hold these opinions, nor belong to this school. I believe it to be possible, not only to diminish the violence and danger of the symptoms in a great majority of cases, but in many to shorten the course of the disease. These indications are both to be kept in mind, and we shall find them happily concurrent in their influence; the methods which palliate most decidedly being apt also to bring to an earlier conclusion the evils they alleviate.

In the early stages, an emetic will not only remove the oppressive uneasiness at stomach, but by determining to the skin and producing a soft diaphoresis, take away the headache and general uneasiness which usher in this tedious malady. If followed by a mild cathartic —I prefer the mercurial, but any other will answer very well—I have often seen the progress of the case at once arrested, and the sick man begin to convalesce even within the first week, or early in the second.

If the case commence with diarrhœa, there may be no occasion for a laxative, or indeed it may be proper to control it with anodynes and astringents. But the exceptions are few to the rule that within the first few days benefit is gained by the free action of castor oil or calomel; either of these may be combined with a small dose of opium, a few drops of laudanum, or a few grains of Dover's powder. If the attack be a mild one, we may now abstain for a while from the administration of medicine, or simply prescribe a gentle diaphoretic, the spiritus mindereri, or the alkaline mixture with paregoric. At this juncture we consider the case attentively, as advised by Watson, to detect the prospective course of morbid action—to "obviate the tendency to death," by injury of any organ or impairment of any function. Each case will present its own special character in this respect. Watson tells us that he found coma the prevailing mode of death. Dr. Nathan Smith, as quoted by Bartlett, says: "The danger of the disease is in proportion to the violence of the diarrhœa; I have never known a fatal case of typhus unattended by it; I have never lost a patient whose bowels continued constipated." If the brain be prominently threatened, and the pulse and strength permit, it may be well to take blood from the arm; but this is very rarely necessary or proper. A few leeches may much more prudently be applied to the temples or angles of the jaw, or cups to the back of the neck. The hair should be cut close, and cold cloths laid upon the head, or affusion of cold water made from the spout of a pitcher at some little elevation. If the bowels be irritated, we may at once commence the exhibition of some astringent anodyne, such as the combination of acet. of lead with opium, both in small and repeated doses; Dover's powder; or the tannin or kino mixture with mucilage, and the tinct. opii camph., while fomentations are laid to the belly, and farther relief attempted by the administration of starch enemata with tinct. opii.

Those who consider fever as a unit, have been led to employ here the great specific and febrifuge, quina; and as many of them in all parts of the world assert, with most gratifying success. Dr. Dundas, of Brazil, maintains the power of the sulphate of quinine over all fevers, continued as well as periodical, non-malarious as well as malarious. He asserts that it will "stop" the British fevers generally, if given in doses of 10 grains every three hours; he quotes in his recent work many testimonials in support of his assertions. Dr. Goolden, assistant physician at St. Thomas's Hospital, London, speaks of "the effect of large doses of the disulphate of quinine, in the treatment of the common continued fever of this country. It was first pointed out to me," he says, "by Dr. Leslie, an eminent physician of Rio Janeiro, who prescribed it in doses of 10 grains every two hours in the remittent fever of that climate. An opportunity was afforded him of trying it on a large scale during his late visit to this country and Ireland, and from his unpublished reports I was induced to try it. At the same time it was tested at the Northern Hospital, Liverpool, by my friend, Dr. Dundas, formerly of Bahia. The effect of the quinine exhibited in large and frequent doses is perfectly safe. It equalizes the circulation, relieves the visceral congestions, checks the diarrhœa, and whether the form of fever be the severe synochus or the low typhoid, the results are equally satisfactory and decided."

A large number of our southern and southwestern practitioners confirm the favorable statements above made. The sulph. of quinine has been long used in our malarious country, and especially in the valley of the Mississippi in the treatment of every form of fever, and, indeed, in all the phlegmasiæ, all pyrectic disorders; some were led to it by the opinion that all our febrile affections were modified by malarial influences, and in so far controllable only by the proper specific; and others by the widely prevailing notion of the existence of a common febrile element in all, chiefly if not exclusively amenable to cinchona and its salts. But the reports differ widely as to the actual value of the practice. In the Kentucky epidemic of 1852, the "abortive treatment," as it is called, by quinine, is said to have failed entirely. And so it is said of many other times and localities. I have made repeated trials of the plan in all varieties of typhous fevers—simple, cerebral or comatose, enteric or typhoid, with diarrhœa, and without diarrhœa, and in true typhus. Sometimes it seemed injurious; I have thought it irritated the disturbed bowels and increased the flux; I have thought it deepened the comatose stupor. Yet it was not always injurious; occasionally it had no effect, and in a few instances it appeared to be of decided benefit. These latter cases were not exclusively, or chiefly among those liable to malarial influences as I had expected. They were of promiscuous origin, and the most marked of them occurred in the mountain region of North Carolina. This was a cerebral case, with no diarrhœa, and scarcely any abdominal fulness; there was stupor, coma vigil, with inarticulate muttering, dry, red tongue, feeble, frequent pulse; her hair was cut close, and her head kept cool with wet cloths; free doses of sulph. quinæ, with moderate quantities of brandy, were given her, and she recovered—a girl of 15 or 16 years—from very desperate circumstances.

Several southern practitioners have come to place great confidence in the veratrum viride, brought recently and strongly to the notice of the profession by Dr. Norwood, who deserves much credit for his intelligent and persevering inquiry into the properties of this valuable article. It is, most emphatically, a sedative in its action upon the organs of circulation, and probably possesses, also, some narcotic quality. Dr. Branch, of Abbeville, whose experience with it has been extensive, writes me as follows: "It reduces the pulse infallibly; and when this result was obtained there would be a cool surface, indeed, all the febrile symptoms would yield. We can hold the pulse at any desired point by increasing or diminishing the medicine pro re nata." He lost but one case in between 20 and 30, a feeble child. Much testimony to the same effect can be found in our journals. The veratrum is an active drug, which requires to be administered with great caution; it is nauseant, emetic, and cathartic in undue quantity, and prostrates the strength singularly. An adult should not take more than 5 to 10 drops at a dose, nor repeat at a shorter interval than two or three hours. It should be watched with care, and suspended if it disturb or oppress the stomach. Its good influence is shown by the diminished frequency of the pulse, an effect which I have repeatedly witnessed.

Should the disease resist these remedies, and progress or remain obstinate, I would not hesitate to resort to the mercurial treatment. Small doses of calomel, combining it with very small amounts of ipecacuanha to determine to the skin may be persisted in at moderate intervals, until the gums become spongy, and the mouth is gently touched. Some prefer the blue pill; Serres and Becquerel recommend highly the black sulphuret. Any cathartic action may be prevented by guarding it with a little opium, or interposing some astringent, tannin or the acet. of lead, by the mouth, or by enema, or by the use of the cretaceous julep with kino. As a very general rule, we may affirm that from this time the troublesome symptoms will subside, and the patient may be pronounced convalescent.

But we are not always thus fortunate; the intestinal affection, whether essential or a complication, remains obstinate and keeps up an exhausting irritation. Under these circumstances I have derived most advantage from the employment of the nitrate of silver in doses of from ⅛ to ½ a grain, given every three hours in pill; combining it with opium or alternating it with Dover's powder, or a solution of some one of the salts of morphine in moderate amount. The practice is derived from the Germans, and receives strong support from the weighty recommendation of Prof. J. K. Mitchell.

Prof. Wood, whose experience and sagacity are well known, prefers to all other remedies in the difficult contingencies that so often beset us here, the oil of turpentine. "It may be employed," he tells us, "in all cases, in the advanced stages of this disease, when the tongue y, and the pulse not strong. But there is a particular condition, that not uncommon, and sometimes a very dangerous condition ch I have often employed it, and, hitherto, have in no one e known it to fail. During the progress, the surface of the tongue becomes quite dry, at the same time there is generally an ease of the tympanitis, and vation, or certainly no abatement of the other symptoms. As his to ulceration in the ileum, I ferred that the oil of turpe ght prove useful, and deter- to employ it." "It acts, measure, as a stimulant, but , I believe, as an alterative lcerated surfaces in the intes- mucous membrane. It sh given in doses of from 5 to ops every hour or two, an est administered in emulsion Arabic, loaf sugar er; a little laudanum being it disturb either the or bowels. In the course of at most 48 hours, some a ion of the symptoms may be ved. As the case improve quantity of the oil should be ished; but care should be not to omit it too hastily." *d's Practice*, vol. i. p. 333.)

Opium has been spoken of by many writers as to be avoided, or at least doubtful in its effect. I have no hesitation in employing it freely in these abdominal cases, and, indeed, can see no special reason for discussing the question, when it is so clearly indicated by intestinal pain and spasm, and diarrhœa, intolerable general uneasiness and restlessness.

Throughout the whole course of many cases, it may be usefully administered in combination with our other remedies; in almost every one it may be occasionally prescribed with advantage, to procure rest and refreshing sleep. Bennett (of Conn.) manages the attack entirely with "minute doses of morphia. Dissolve sulph. morph. gr. i in aquæ, 4 or 6 ozs. S.—A teaspoonful every two hours. This will relieve the pains of the first stages and the consequent jactitation, &c.; the patient sleeps quietly." He gives the duration of 30 cases thus treated, at from 16 to 45 days. A laxative was now and then exhibited. I have witnessed the pleasant palliation of this course in several instances.

Whenever, at whatever stage of the disease, the strength of the patient fails, and prostration threatens, we must resort to stimulants and to nutritious fluids. A feeble thready pulse, a disposition to syncope on moving or rising from the pillow, a weak impulse of the heart in its action, call for immediate support. Wine whey and wine are the best of our stimulants, and should be given freely. If insufficiently exciting, we must substitute brandy and other spirits;

gled with milk, and made palatable with sugar—milk punch—we nourishment also. If the patient can take them without nausea lisgust, good strong broths should be allowed. I have repeatedly solid animal food taken with great relish, such as oysters and e, and digested well—judging from the stools and sensations of patient. It is surprising how much stimulant can be borne and n profitably in typhous fevers of all kinds. Dr. Todd, not long e, reports the treatment of eighteen cases—like most others, not inguished controversially, mixed cases, probably, with stimulants lusively. "Symptoms: mulberry rash; bowels either slightly re- d or confined; delirium; in six there was coma; the pulse small very rapid. Every hour or half hour, day and night, from ℥ss i of brandy was given, with a draught of aquæ ℥i, spts. æth. chloric. in., carb. ammon. gr. v, every second hour. The patients were uced to drink as much strong beef-tea as possible. In all the first e of the disease had passed; all recovered but one; the pulse dimi- ed steadily in frequency, and the skin became moist."

he importance of thus sustaining the patient in protracted and ting disease cannot be exaggerated. Stokes tells us that his friend ves desired no better notice on his tomb than the epitaph, "*He fed rs.*" A function long suspended is reluctantly resumed, and the rition of the body neglected—suppose it were in health?—for two hree entire weeks and more, will become impossible.

hould perforation take place, as shown by the signs formerly de- bed, there is, indeed, very little hope of relief, but the patient must be abandoned. Large doses of opium, to allay pain and put an to intestinal movement, must be promptly exhibited; the strength ained as well as we may, and soft fomentations or stupes of hot its applied to the distended belly. It is said that a few—very few, e recovered from these desperate circumstances.

onvalescence is apt to be slow and tedious. Both mind and body often reduced to a profound imbecility, from which they emerge y gradually and with slow pace. Blisters heal reluctantly; for ch reason I prefer generally the more transient irritation and re- sion of mustard. Parts pressed upon are apt to ulcerate, and must protected as well as possible.

elapses sometimes occur, and should always be guarded against assiduous attention. The apartment must be kept clean and well d. The diet should be made appropriate and regulated as to quan- . I have no great faith in the so-called tonics, of which bark and are the favorites. Wine and ale and porter are more to be con- d in. The tendency to relapse has lately been so remarkably pro- ent in some localities in Great Britain, that Dr. Jenner was led to sider the prevailing epidemic, of which he has given us an excel- t treatise, as a special variety, which he has denominated "relapsing r." This is, however, regarded by many as a distinct disease.

econd attacks are rare; yet it seems that they sometimes happen. this respect enteric fever resembles the contagious fevers among ich it is properly placed; and, in a degree, the exanthemata with ich it has been improperly classed.

TYPHUS FEVER.—Typhus gravior; true typhus; Irish typhus; jail, ship, hospital, camp, and emigrant fever.

Under this head I include the maladies known by the several appel-
ions thus collated; the description will be found to comprise the
rd and fourth groups into which I divided the varieties recognized
yphous fever, viz: 3d. The cerebral, and 4th. The putrid or ma-
nt.

is disease is well known in all countries, as belonging to certain
ions unfortunately common everywhere. In the densely crowded
anes and alleys of great cities; in the hovels of the poor and
try; in the horrid and accursed slave ship; in the
and dungeons of prisons; in the hold and steerage of
ely packed emigrant vessel. it is sure to be readily generated.
prompt and certain e poison "ochlesis." It very
curs sporadically in its form; in its lighter shades it
and then met with under e contingencies as typhoid or
c fever.

phus fever comes on with initiatory stage of undefined
ness and indisposition f t part, but sometimes attacks
ly with chill and rigor. , dull headache is usually the
symptom; there is languo nwillingness to move, weak-
and pain in moving, and gue; the face is flushed and
v; there is anorexia and ly nausea and vomiting. The
soon becomes hot and dry— tly hot very often; in certain
ded experiments the therm applied to the surface rose to
and even 109° Fahr. The pulse is frequent, generally full and soft or yielding; the heart acts feebly often from the first, a point specially dwelt on by the distinguished Dr. Stokes. The mind is depressed and dejected; delirium soon comes on with low and constant muttering, incoherent except when the patient is spoken to and his attention called. Somnolence may be noticed from the beginning, increasing as the case progresses into stupor and coma; of which Dr. Gerhard remarks that it is "always a most unfavorable sign." Watson, it will be recollected, expresses the same dread of it in ordinary typhoid cases. It differs greatly in degree and somewhat in kind. I have seen patients recover from profound degrees of it, when they had lain for hours with their mouths open, breathing stertorously and swallowing with difficulty fluids put into their mouths. There is coma vigil, in which the patient lies stupid with his eyes open, red and injected, occasionally tossing and moaning, inattentive, unreplying, yet not seemingly asleep; a state perhaps somewhat analogous to somnambulism. True coma—somnolens—resembles apoplectic sleep, from which it is difficult to arouse him. The pupil of the eye is usually dilated, and does not play readily on the admission of light. There are cases in which it is closely contracted—Graves' "pin-hole pupil"—and it is in these chiefly, though I will not affirm exclusively, that light seems to annoy the otherwise indifferent subject. Indeed, after the first week, he appears both to hear and see somewhat dimly and confusedly.

About the end of the first week an eruption is thrown out upon the skin, on the trunk principally, extending to the neck and limbs; the maculæ are chiefly circular; they are of varied hues of red and brown. I have seen them of a dark brownish yellow, like freckles; they disappear upon pressure the more readily the lighter their color, the darker scarcely fading under the finger. The tongue, at first foul with a viscid yellow fur, soon becomes red and clean, smooth and dry; the whole mouth is of a fiery red; the breath is offensive; the teeth are blackened with sordes, and the gums; the papillæ disappear from the tongue, which cracks often, and exudes from its smooth glassy surface a thin, offensive blood. The bowels are sometimes costive in these cerebral cases; nor is meteorism a universal symptom. About a year ago, I saw in consultation three such cases nearly at the same time, two of whom recovered and one died. The latter was costive, though his bowels were easily moved. He sunk with coma. The second, with stupor as profound, and neither tympanitis nor diarrhœa, recovered. The third also got well, after about three weeks of a strange and obstinate indifference, rendering her as unmanageable a subject as I ever saw; she was tympanitic, but had no diarrhœa, and would take scarcely any medicine, nor permit an enema to be given her. On her recovery and to this day, she professes entire forgetfulness of the whole duration of her illness, though alert and talkative all the while.

Hemorrhage from the nostrils has been more frequent in my experience than the books describe it. I have seen oozing from the tongue and gums more rarely. We meet occasionally, too, with bleeding from the bowels.

The respiration becomes much impeded as the case progresses, hurried and oppressed with sighing or short cough, and in the comatose stertorous.

The *duration* of the lighter cerebral cases was very much the same as of enteric or typhoid fever; in putrid or malignant typhus, the progress was more rapid, and the termination generally within the fortnight.

The *prognosis* varies greatly under different circumstances. It would seem, from a very extensive tabular statement quoted by Bartlett, to be specially influenced by age. In the Belfast Fever Hospital, there died under twenty years, out of more than 5,000, not quite three per cent.; while beyond that age the proportion was in nearly 4,000, about eight per cent. The facility for bettering the physical condition of the patient, by removal from the causative agencies that have produced the attack, seem to me to exert more influence upon the result than anything else. A free black taken from a wretched hovel or a cellar destitute of all comfort, close and foul and damp, carried to a comfortable ward in a well ventilated hospital, cleansed and placed in a neat bed, will scarcely need any treatment besides these hygeian changes. An emigrant brought ashore out of the pandemonium of the foul steerage; a slave removed to the sick-house from his noisy and filthy quarter and washed and dressed; these will revive at once. But if we cannot change these conditions, it is scarcely possible for them to survive; at least they must die in large proportion. So, also, if from any exposure a person in the better ranks of life is struck down, as we cannot make him more comfortable by hygienic attentions, he has little to hope but from assiduous nursing and nice professional skill. In private practice, therefore, I think the proportional mortality is usually greater than in hospitals.

The individual prognosis is drawn from the circumstances which show the capacity for resistance in the constitution. In advanced life and in intemperate subjects, the prospect is gloomy. The black is readily assailed by typhus and sinks promptly under it. The overworked and underfed are unpromising patients. A low delirium with restless dejection; subsultus tendinum, hiccup, oozing of offensive sanies or large collection of sordes on the teeth and about the mouth; picking at the bedclothes or imaginary objects in the air; prolonged coma with stertorous breathing; sinking to the most dependent part of the bed; sloughing of points pressed upon; a cadaverous odor from the body; ecchymoses or vibices or very thick petechial eruption; suppression of urine: these are all unfavorable signs. On the other hand, an awakening attention to things about him; complaints of blisters and counter-irritants, or of any pain or thirst; quiet sleep, with moisture of skin and mouth, and easy awakening, are favorable.

Pathology.—There are many circumstances in the history of the more tilential forms of typhus which seem to give a degree of plausibility, not absolute confirmation, to the anciently received notions of an entially putrescent tendency in the fluids of the infected body. The mpt disposition to gangrene of all pressed and inflamed parts; the ack and dissolved state of the blood, "gory and diffluent;" the foul rdes and fetid oozing from the mouth; the internal hemorrhages and the petechial and ecchymosed discolorations of the surface, with the offensive corpse-like smell from the sick body, have, from the earliest times, been assumed to evince a characteristic and peculiar proclivity to disorganization both of the solids and the circulating mass. It is unnecessary now to urge objections against the use of the old humoral words fermentation and putrefaction as applied in their ordinary and mere chemical sense. It is clear that they cannot be thus employed, properly to denote the conditions of the animal fluids in a living state, however depraved and morbid that state may be. We resort to them at present merely to point out those alterations which imply the greatest defect of vitalization, such as approximate most nearly to the changes they are to undergo when entirely deprived of life. The tendency to decomposition of the animal tissues and fluids is only resisted by the force of the vital laws; but in typhus more than any other malady perhaps, is this influence of vitality impaired and overcome; the nervous energy, the power of assimilation and that of defecation, the true protective and preservative functions, are long before death notably weakened, and indeed nearly extinguished by the causes to which we ascribe the disease.

Pathological Anatomy of Typhus.—The brain and its membranes usually show a certain degree of turgescence and vascular injection; sometimes effusion of serum or blood is found, and more rarely other changes which seem the results of inflammation. Though these have been much dwelt on, yet it is confessed by all, as by Cheyne and Watson, "that the diseased appearances are not always—perhaps not even generally—proportionate to the severity of the symptoms which denoted cerebral disturbance." We find here some analogy with the fact formerly stated, that the liver which shows such uniform disturbance in the course of our malarious remittent, and during convalescence from it, exhibits so little lesion (*post-mortem*) as not to be detected. The lungs are frequently found loaded with blood, dark, heavy, and friable. The heart is usually softened and flabby; the blood black and incoagulable. "The gastric mucous membrane," says Wood, "is often reddened, much softened, and sometimes mamellonated; that of the intestinal canal is often free from disease, though sometimes found inflamed in cases complicated with diarrhœa or dysentery. No disease whatever is observed in the glands of Peyer, unless in a very few cases, which it is fair to ascribe to complication with enteric fever." The liver is little, if at all, altered. The spleen, as in most fevers, undergoes some enlargement and softening, but not uniformly. The cadaver runs rapidly into decomposition.

The *causes* of typhus are well understood. It is very apt to affect large numbers, as an endemic, and as a local epidemic. It is the direct effect of the poisoning of the blood by retention of its own effete exhalations, or those of other human bodies, in close and stagnant air; a strong predisposition is generated in individual subjects by hard labor and insufficient food. Hence it was called the "famine fever" in Ireland. We meet with it occasionally among the negroes on the southern plantations, living in old neglected houses, where it is soon put an end to by removing them to new quarters, or if the season permits, to tents in the open pine lands. It is perennial in the cellar population, and in the courts and alleys of great cities. Typhus, after being thus generated, spreads by contagion. In hospitals the nurses and physicians are attacked. In the wards it is apt to extend from bed to bed. It is conveyed by fomites. Thus were infected at the famous "black assizes" at Oxford, Exeter, and Taunton, the judges, the bar, and the court generally, by contagion adhering to the clothing and bodies of the prisoners brought in from the foul and pestilential jails. Like all other contagious fevers, it may become epidemic—locally, but, I think, never generally. It seems to be absolutely controlled in this respect by free ventilation, abundant alimentation, and other proper measures of hygienic management. Relapses are rare; and second attacks are said to be uncommon.

Treatment.—The determination to the brain, so prominent a symptom from the first, and so obviously the source of the most serious danger generally, has always demanded immediate and assiduous attention. Venesection has been daringly practised by many, on the principle advanced by Good, who says tersely: "There is risk in the practice, but there is death without it." In cases of sudden and violent invasion, with flushed face and red eye, with much disorder of intellect or apoplectic stupor, if there were any remaining strength of system, I would be inclined to bleed with caution, keeping my finger on the pulse, and desisting on the approach of syncope, which is very ready to supervene generally. Topical bloodletting is safer, and not ient. Leeches may be applied to the temples and mastoid sses, and cups to the back of the neck. The hair should be cut or shaved away, and cold cloths or the cold douche employed. calor mordax, the marked heat of skin, calls for the cold bath, ch should be freely used in all cases, except where diarrhœa or monary affections are present, or the subject is peculiarly old and irm. A bath should commence the management of every case of inary character, either cold or tepid, as the above-mentioned conons may indicate. The skin must be thoroughly cleansed, and body and bedclothes used, removing those which have been , and destroying or purifying them at once.

emetic of ipecacuanha, or an antimonial, will often do service s point of time. The bowels must be moved without delay; the urial cathartic is to be prefer In the hope of a successful to arrest the attack, we may ine with our calomel or blue a free dose of sulph. quinine, s or 12 grains, which may be ated every third or fourth hour. egard this as an experimental ription, and am unable to point any particular cases to which adapted. Yet there is accumu testimony in its favor, and I e myself seen it occasionally ial. Its effect, however, is by neans uniformly salutary; a uld leave it off if a few doses not productive of, or atten improvement. The veratrum seems applicable here as w in enteric fever, if not even so; and I think deserves to ied extensively and persever. If the force of determination the brain give the tendency death, as most practitioners believe, it is surely best obviated by a remedy with which we can regulate so impressively the action of the heart.

Diaphoretics have long occupied a prominent place here. The James's powder, or pulv. antimonialis of the shops, may be given in combination with calomel and the nitrate of potass., if the stomach will retain it. As the case advances, the more cordial and stimulating sudorifics must be substituted; the infus. rad. serpentariæ, the acetate and carbonate of ammonia, the alkaline diaphoretic with tinct. opii camph.

Should the pulse still flag, and the debility, vascular and muscular, of the patient appear to increase, as shown by extreme languor, disposition to syncope when moved, low delirium, with muttering, etc.; nay, often from the very onset, it is necessary to resort to stimulants, which, perhaps, constitute the most important portion of our remedies, in the great mass of cases. Wine is justly regarded as the chief, and most efficient, and least liable to objection. Wine whey, drank warm, is nutritious, and aids our diaphoretics. The white wines, Madeira and sherry, are the best; they should be sound and good. If diarrhœa is present, port wine should be chosen. It is important that the patient should take his wine willingly, and in sufficient amount; no medicine should therefore be mingled with it, for fear of disgusting him and offending his stomach. If it fail to excite properly, or lose its effect, ardent spirits must be substituted. Milk may be mingled with them and made palatable. He should be fed also with beef-tea, chicken-broth, and nourishing soups, in such mode and quantity as he can be persuaded to take them.

Local determinations must be opposed by revulsive applications of mustard poultices and epispastics. The head having been shaved, a blister may be applied to it, with hope of benefit in coma.

It has been mentioned that in those low fevers, blistered surfaces, and parts pressed upon are apt to ulcerate or slough superficially, and the sores thus formed are painful and difficult to heal. Some of this suffering, at least, may be prevented by assiduous attention. When the patient is too weak to change his posture in bed, he should be frequently turned by his nurses, and the parts on which he has been lying soothed and revived by gentle friction with the hand. Soft pads may be placed under him, at proper intervals, to relieve and alternate the parts pressed upon; broad adhesive plasters aid in evading the effects of this pressure. Dr. Arnott's hydrostatic bed, a sheet of India rubber cloth laid over a vessel containing water, is of great value. It yields in every direction, so that the weight of the body, instead of being supported upon a few salient points, is diffused over the whole lower surface equably. This bed is not always procurable, however, and it has been proposed to fill the ordinary air-cushions with water partially, which will yield, and give a diffused support in a similar manner. When sloughs have formed, the parts may be dressed with bark, or the charcoal poultice, and washed with diluted mineral acids. The chlorides also destroy their offensive odor, and promote their healing.

During convalescence it is customary to prescribe cinchona as a tonic. A strong infusion, with some alkali and aromatic, is the best formula. It may also be combined with the nitric or muriatic acid, which will cleanse the mouth of the patient, and correct the fetor of his breath and excretions.

Throughout the whole course of the attack, and especially in its latter stages, it is of the utmost importance that the apartment of the patient should be kept clean and pure, and well ventilated. His bed and body linen should be frequently changed, his person well washed or sponged, and every evacuation immediately removed. As few attendants as may suffice for the necessary nursing and manipulations must be allowed to remain about him.

His convalescence will be tedious. He will be found frequently reduced to childish weakness, both of mind and body. His muscular strength must be carefully husbanded; it is dangerous for awhile to allow him to assume the erect posture; his first experiments in locomotion must be made with caution, and suspended at once if syncope threaten to supervene. He must be protected from all care and anxiety, and all disturbance of temper. His senses are at first dim, and regain their capacities very slowly. Deafness, which has unaccountably been regarded by many writers as among the favorable symptoms, is especially apt to be tenacious. This is explained by Dr. Passavant, of Frankfort, who tells us that in his autopsies of typhus he has found unequivocal tokens of varying lesion of the ear, not met with in any other disease, and therefore regarded by him as peculiar and characteristic. "The pars petrosa of the temporal bone," he affirms, is found injected; the tympanum has lost its transparency, being reddened and thickened, sometimes with little ecchymosed spots.

CATARRHAL FEVER.—It is not usual to arrange under our present head of idiopathic fevers the form of disease which is now about to engage our attention. In a very large proportion of the cases to which the name of catarrh is given, an inflammatory affection of the mucous membrane of the respiratory apparatus, a true bronchitis of
ater or less intensity, forms a prominent, perhaps the most promi-
it, symptom. Hence, some writers designate it as a mere modifica-
on of bronchitis; while others, regarding it as a specific disorder of
respiratory organs, consider [illegible] cal affection as of paramount
sequence, and the febrile irri [illegible] f the general system as secon-
symptomatic, and incident
these are narrow views or [illegible] topic of peculiarly vivid and
interest. Catarrhal feve [illegible] ccurring sporadically and epi-
aically, is perhaps the most co [illegible] of human maladies, and may
ffirmed to constitute, dire [illegible] indirectly, one of the widest
s of human life. Let us [illegible] how many fatal cases of con-
nption owe their origin to th [illegible] mon colds" of every day fami-
rity; let us look over the bills [illegible] tality when influenza prevails,
l we shall be prepared to estim [illegible] matter correctly. It is stated
t the number of deaths in the c [illegible] London from epidemic cholera,
was less by a considerable amount than that produced by the next year's invasion of influenza; and we are told that the *grippe*, when it assailed New York in 1843, at once doubled the usual or average weekly list of deaths.

We shall see, when we come to detail the history and symptoms of the disease, that the local affection to which such undue prominence is given, is by no means invariably striking in degree; nay, that it is not unfrequently wanting altogether. In describing the London influenza of 1833, Watson says distinctly, "the catarrhal affection is sometimes absent or imperceptible." The head is sometimes exclusively attacked; the Schneiderian membrane, the membrane lining the frontal sinus and antrum maxillare, the conjunctiva, the locomotive apparatus, the muscles and joints, often bear the whole onus; and particular epidemic vitiations are designated, on account of their rheumatic or arthritic character, as "break-bone fever," while others are characterized by extreme muscular debility. Richter, "*nomen clarum et venerabile*," considers catarrhal as nearly or quite identical with rheumatic disorder; and there are many facts and reasonings which go to render this opinion plausible, though I am not disposed to contend for its truth or absolute correctness. The mucous membrane of the stomach and intestines has been noted as being so liable to be deranged, in connection with influenzas, that Holland, recording the concurrence of dysentery with epidemic catarrhal fever at various periods, as in London in 1762, and again in 1833, and in 1837, says, that "the fact is so well established by repetition, that it is difficult not to suppose a direct connection, either in the nature of the cause or in a liability, created by the prior disease, to be affected by the ordinary cause of the latter." This concurrence of the two was remarked in New York, in August, 1843.

All these circumstances being duly taken into account, I cannot help concluding that the bronchial inflammation, though a very general element of catarrhal fever, is a feature altogether subordinate to the constitutional derangement, and holds the same relation to it as the hepatic affection of remittent, and the gastro-duodenitis of yellow fever. The name, which is based upon, and suggestive of error, is so fixed by long and universal usage, as not to admit of any change. Alison, while he describes it as "consisting essentially in bronchitis, with certain accompaniments," tells us, nevertheless, in the very same breath, that "it is always attended by, or forms part of, a constitutional fever;" and the same inconsistency will be found to run through the views of all who regard it as one of the phlegmasiæ, rather than correctly an idiopathic pyrexia.

The *symptoms* and *history* present, as has already been stated, a very great and interesting variety. Beginning with the simplest and most ordinary sporadic attack of a mere "cold," as the phrase is, we shall notice first, a thickening and dryness of the nostrils, which are full or stuffed; there is heaviness of the head, especially along the sinus above the eyebrows, and some aching of the face and jaws. After a time the eye reddens and weeps, and there is coryza, a very large discharge of thin serum flowing from the nose, which often becomes so acrimonious as to inflame the upper lip, and excites frequent and violent sneezing. This "cold in the head" may and does often constitute the whole of the disease. In a grade of increased severity, we have the above ailments combined with a sense of chilliness, while the skin is warmer to the touch than is natural, and dry and harsh perhaps; there is oppressive, and it may be, very violent headache. Next comes on a feeling of rawness, soon aggravated to soreness in the throat, and fauces, which extends to the larynx, trachea, bronchi, and thorax generally, accompanied with an uneasy tickling and urgent disposition to cough. The cough is rough and painful, and at first dry and hoarse, as is the voice; but, after awhile, a tenacious mucus is expectorated, which, becoming thicker and thicker, assumes the color and appearance of pus, its discharge being attended with relief. The pulse is frequent and rather hard, but not very full; the skin hot and dry; the tongue white and furred. Pains in the back and limbs, and aching, as if in the very bones, often exceedingly distressing, render motion annoying; and the patient complains of stiffness in the joints, with more or less languor and debility. There is also, for the most part, an inordinate and unaccountable gloom and dejection of spirits; Rush quotes an invalid under his care, as saying, that the fever not only deserved the familiar name of "break-bone," but should be called the "break-heart" also. The fever is distinctly of continued type, reaching its acme about the third or fourth day, and running an average course of about a week; the height of the exacerbation is usually in the evening, when all the symptoms above detailed are apt to be aggravated; the cough especially becoming more troublesome, and connected with more thoracic soreness, tension, and stricture. The thirst is increased, and there is perhaps gastric uneasiness, with restlessness and jactitation. I have said that the skin is commonly hot and dry; and there is an old and prevalent notion, that of all febrile maladies this is the one most intimately connected with, if not dependent upon, a diminution or suppression of the natural and healthy cutaneous transpiration. But daily observations show us, that no such suppression is necessarily present here; although, like other fevers, apt to bring on or concur with this condition of the surface, yet, like them, it is liable to not unfrequent exceptions in this respect. I have seen many cases, indeed, in which the perspiration was unduly abundant, and some in which the sweat was not only increased in quantity, but obviously iated also in quality, being of acid, or other disagreeable odor, and scoloring the body linen.

The general *prognosis* in catarrhal evers is favorable. Under ordinary circumstances, the febrile excitement subsides from the fourth or fifth day, and the patient recovers wi a gradual decline of the cough, his expectoration becoming easier an more abundant, and consisting [illegible] muco-purulent matter. In adul f middle age and average con[illegible]n it is rarely fatal, except by ing into action some other more tenacious or destructive malady. [illegible] tendency to phthisis pulmonalis belonging to individual deteriorati f system, or hereditarily derived, is very often developed, or at least n rried forward by it. Chronic bronchitis sometimes retains a tedious and tenacious hold, and asthma has been known to follow it. Pregnant women when attacked by it, are very liable to uterine hemorrhage, and abortion, or premature labor; and it has been made a question upon this observed fact, whether there were any specific tendencies in the nature of the existing irritations to affect the uterus, or whether this organ takes on its morbid and contractile excitement merely from the so often repeated mechanical agitation of the trunk by coughing.

In old people we have, prominent among the effects or contingencies which we are now discussing, that condition of the lungs known in the books as peripneumonia notha, an effusion of mucus taking place in the air cells and bronchial tubes so rapidly, and in such abundance, as often to menace, and in very infirm subjects sometimes to occasion absolute suffocation. The same sort of termination may be presented in young infants, or we may be annoyed and alarmed by the supervention of laryngitis, and this combination of inflammatory croup is apt to prove obstinate and dangerous. In children of more advanced age, especially when dentition is going on, the mucous membrane of the digestive tube is very frequently implicated in a degree which requires special attention. In these little subjects, the cough is perhaps the symptom earliest observed, dry and hacking at first, and soon accompanied with some thoracic rattling and wheezing, and more or less embarrassment and hurry in respiration. As night comes on, fever rises high, with hot, dry skin, and a pulse of great frequency, hard and jerking; there is extreme and distressing thirst; determination to the head is very likely to ensue, with flushed face, red and suffused eye intolerant of light; on the one hand, there may be drowsiness, increasing progressively to stupor and coma, or on the other, an uncontrollable restlessness agitates the sufferer, who tosses incessantly, moaning and throwing his arms upward, rubbing and pressing the scalp, and finally falling into violent convulsions; or the stomach is assailed with vehement irritability and frequent retching, rejecting everything offered. In a case of this kind occurring under my care in March, 1821, a child of about three years of age threw off a quantity of fluid resembling coffee-grounds, not in any way distinguishable from the so much dreaded black vomit of yellow fever. He recovered, however. My friend and colleague, Professor Moultrie, informs me that the same thing happened to a young patient of his, laboring also under catarrhal fever, in December, 1834.

In these gastro-intestinal attacks we shall find the tongue at first whitish, or covered with a yellow fur: soon, perhaps, assuming a dark red or brownish hue, inflamed or ulcerated, as is often the whole lining of the mouth and fauces; the bowels are much disturbed, the stools being greenish or otherwise discolored, or thin and serous, and acrid, so as to inflame the anus and neighboring surface, and give rise to great pain at the time of an evacuation. The duration of this class of cases is usually from six to ten days, and the termination doubtful.

A favorable prognosis may be drawn from the decrease of thirst and the great frequency of pulse, the skin becoming soft and moist, and the alvine discharges less acrid and more naturally fecal. Convalescence is, however, always slow, the cough continuing for some time, with more or less embarrassment of respiration, as the patient cannot yet be taught to assist expectoration by any definite or voluntary effort. Besides the mucous râles which belong to the history of all catarrhal affections, auscultation will offer in young children, a varied combination of sounds, cooing, purring, and sibilant, which exhibit the thickening and partial occlusion of the bronchial tubes extensively through the lungs, while there is very little less of resonance on percussion, proving that the capacity of the cells is much less impaired. On the other hand, an increase of the frequency of pulse, which is often incalculably great; more urgent thirst, and retching, unchecked diarrhœa, perhaps running into dysentery; more and more difficulty of breathing, sometimes produced not by mere accumulation of mucus, but by actual congestion, either passive or inflammatory: the occurrence and repetition of convulsions, or the supervention of coma, mark the downward progress to a fatal issue.

We meet occasionally, even in adults, with this combination of intestinal with gastric disorder, which I have just been describing as more common among the infant subjects of catarrhal fever. Here, there is nausea, with discharge of vitiated bile and porraceous matter, both upwards and downwards, sometimes alternately, sometimes concurrent with cough and difficult and painful respiration, the expectoration being scanty, and consisting of a ropy, tenacious mucus.

The disease, as I have thus portrayed it, is in this climate and, as far as I am aware, over our whole American continent, usually inflammatory in its character, and very rarely assumes the contrasted features of the typhoid or low variety of febrile movement. From the testimony of the writers of the best authority, however, this would seem to be its most general form of prevalence in Europe, in large cities especially, and when it exists as an epidemic.

Alison te is "that a remarkable degree of debility is an essential
t of the stitutional fever of influenza, which, from that cause, is
very dangerous to old or infirm and feeble persons;" and Wat-
ses such language, as to make us suppose that he regards this
ular and general prostration as the most uniform and essential
in its history.

e met with very few instances of this nature, and these have
almost exclusively among our negroes, especially those who,
but imperfectly clothed lly protected in their sleeping
from cold, have yielded pressing influences in the hard
r of our more severe w
h attacks are attend he well known evidences of
rial derangement and va ostration. In addition to the
rhal or bronchial disord often violent and heavy head-
with muttering deliriu g, great languor, despondency,
ssion at the precordia, ghing; the pulse is frequent,
lar, soft, and feeble; t f the body varying, but often
the natural standard skin moist and relaxed, with
cy, not rarely to pr ing. The tongue is dry and
he teeth and lips cover sordes, the breathing exceed-
gly hurried; sibilation is heard n the lungs, and the resonance
and respiratory murmur much impaired. Death is usually preceded by coma.

The *causes* of catarrhal fever are, perhaps, as widely distinct as any agencies in nature. Some of them are perfectly well known and familiar, while others are enveloped in the deepest obscurity. Sporadic or individual attacks are ascribed with definite certainty to contingencies which can be repeatedly experimented with. A *cold* follows exposure to night air, sitting in a strong draught or near a window, or getting the feet wet, or sleeping in damp sheets, or being caught in a thunder-shower, or remaining long unprotected in inclement weather; these are unquestioned facts as regards susceptible individuals. Next, we have great numbers of persons attacked at once, upon any very sudden and remarkable change of temperature, whether the thermometer rises or falls. *Colds* are always common in the changeable seasons of autumn and spring. Every one protects himself from the immediate impulse of a change from heat to cold, and the universally received theory is, that the cutaneous transpiration is suppressed by such change, and thus that disease arises. But the opposite alternation is not less dangerous, probably, when the same explanation will not apply. Martaens tells us, that on a very cold winter night in 1782, the thermometer at St. Petersburg suddenly rose thirty degrees; next morning not less than forty thousand people were attacked with catarrhal fever. Farther, there are particular winds which everywhere are known to favor its prevalence, independently of any change of weather from hot to cold, from dry to damp, or *vice versâ*. The southeast wind, in England, is charged with this influence. It brings with it, says Watson, "a haziness seen in the country, remote from smoke and quite distinct from fog." He goes on to ask, "What is this haze? Has it any connection with the morbific quality of this wind?"

Nothing, however, can be more clearly made out than the absolute independence of catarrhal fever, as prevailing epidemically, upon any of the sensible qualities of the circumambient air or upon any cognizable conditions of the atmosphere, electrical, barometrical, or thermometrical. Although sporadically producible, as I believe, by all vicissitudes in these qualities and conditions, yet it prevails in masses without any reference to them. I have seen it general or prevalent here in every month of the year in different years.

Influenza, an Italian word originally, is now universally employed to refer to this indefinite extension of the disease, which has by the great majority of pathologists been ascribed to contagion. Cullen calls it "*catarrhus a contagione*." Alison adopts the phrase, and speaks of it as a "contagious disease." Holland and Williams dwell on the similarity of its progress and propagation with those of Asiatic cholera—the former being apparently inclined to attribute them both to animalcular irritation. Watson does not refuse his assent to the received doctrine of its contagiousness, and maintains definitely, "that it may be generated by a cause both material and portable seems scarcely to admit of a doubt." The suddenness of its invasion and the potency of its influence are alike remarkable. "In one of the London prisons," says Holland, "fifty or sixty persons fell ill of it on one day; and I have often known, in private practice, six or eight in a house seized with it in twenty-four hours." Watson relates a singular story in illustration of this point. In April, 1833, the English ship Stag approached the Devonshire coast, with all hands in good health. Within half an hour after reaching a certain distance from the shore, the wind blowing out to sea, there were forty men down with influenza; in four hours sixty; and in twenty-four hours one hundred and sixty. On that very evening, there was a regiment in Portsmouth, with every man well, of whom, on the next morning, so many were sick with influenza that the garrison duty could not be performed; and in very strong language the same author states that on those two days (April 3d and 4th) "all London was down, smitten with it." We are able to trace the agency of this peculiarly obscure influence at sea, as well as on land. "In May, 1782," says Good, "Lord Anson sailed with a fleet for the Dutch coast, and Admiral Kempenfelt for that of France. The crews of both fleets were well on sailing, but in the same month both were attacked very generally, and the latter was obliged to return home to recruit." It seems to have made its appearance in the most distant regions almost simultaneously, or has swept over whole continents with amazing rapidity, and even crossed the Atlantic repeatedly. The influenza of 1781–82 is said to have appeared first in China, to have travelled thence through Asia into Europe, and to have reached our New World in the following year.

It prevailed in Russia in February and December, 1781; we read of it in England in April and May, 1782; and in the same autumn in Spain and Italy. Huxham describes it in 1733 and 1743, Sir George Baker in 1762, Sydenham still earlier, 1675. All these are identical with the influenza of to-day. Of the more recent dates, we have the European epidemics of 1831–33–37, each very extensive. In Copenhagen, early in January, 1837, Dr. Otto says that at least thirty thousand persons had it at once. Within six or seven weeks Dr. Holland supposes that half the population of London, say six hundred thousand, suffered under it. It was calculated to make progress in the same general direction as cholera—westwardly, and about as fast—eighteen miles per day, and in many places was thought, I know not upon what details of evidence, to have been imported, as at Norwich and Exeter in England, and at Lisbon in Portugal. During its prevalence, everywhere, it intermingles like other epidemics, its characteristic symptoms with those of any co-existent diseases and forces them, as Rush has it, "to put on its livery."

Now, as to the nature of this undefined and potent agency, to which we must ascribe the sudden invasion, steady propagation and vast extension of influenza, there has been no want of conjecture and speculation. Setting aside the contagious property which seems to be very plausibly regarded as one of the elements, but which does not afford us a relevant and satisfactory explanation of the phenomena, there are suggested three sources of a poisonous agent capable of producing the effect above recited. I have already alluded to the animalcular theory of the generation of epidemics, which has found favor in the eyes of O'Neale, Henle, Holland, and others, but which is established by no positive proof. Next, we have the analogy of the hay-fever of England, as pointing out the possible diffusion of a vegetable irritant, through the atmosphere, which excites into catarrhal disorder the susceptible systems of some individuals with ascertained certainty. We have several such instances on record, on the authority of Gordon, Bostock, and Elliotson. The first supposes the efficient property to reside in the aroma of the sweet-scented meadow grass, "anthoxanthum odoratum." Not only are the effluvia from a hay-field or a stack of hay, thus influential in bringing on catarrhal fever, but we have the story of a lady who suffered an attack on the approach of her children, after they had been allowed to play in a hay-field. I know of but few similar statements in reference to our own country, nor am I aware that we cultivate the particular variety of grass above designated. It is enough to state that there is no established coincidence between the invasion of influenza and the progress and condition of any known form of vegetation. More recently Schoenbein has maintained the influence of ozone in the production of catarrh, both sporadic and epidemic, and the inquiry is earnestly prosecuted by observers in both hemispheres. Lastly, Prout tells us that the seleniuret of hydrogen, when breathed in the laboratory, will bring on catarrh, and a friend of mine has been severely attacked from inhaling chlorine and some of its compounds. But these are vague conjectures or hints at analogies, which fail to throw any light upon what Sydenham so long since called the epidemic constitutions of the air, the most potent and most obscure of the influences which give origin and prevalence and extension to diseases.

Treatment.—If sufficiently early warned of the approach of a cold, catarrhal fever or influenza, we shall often be able, though not uniformly, to arrest its progress and escape the visitation. The premonitory, or rather incipient symptoms are too well known to every one. When assailed by these, which differ somewhat, yet not greatly, in different individuals, the gravedo or sense of fulness and heaviness of the forehead just above the eyes and along the frontal sinus, attended with dryness and stuffing or tickling of the nostrils, and frequent sneezing, with or without rawness or slight soreness of the throat and chest, and inclination to cough—a full dose of opium should be promptly prescribed and the patient put to bed. This practice was recommended many years ago by Young; it is highly extolled by Prof. Chapman, who bears the most pointed and positive testimony to its efficacy; and I have frequently had occasion to witness in others, and to experience in my own person, its excellent and very pleasant effect. I do not know that any one of the preparations of opium deserves a preference over the others. If, as is supposed, the *modus operandi* consists in a combination of stimulant with diaphoretic action, perhaps the Dover's powder should be chosen. I have found the tincture alone, or the camphorated tincture, very well adapted. One thing I would insist on: the amount should be sufficient to insure sound sleep. This is a state of the animal body which, though it favors the invasion of some maladies, suspends the morbid action in which others seem to consist, and if not absolutely curative in others, still gives us a very serviceable interval of remission and relief. To apply these remarks to our present subject: I have often observed that when I have gone to sleep, laboring under the annoying inconveniencies of a severe cold, I have frequently awaked almost unconscious of them, and have enjoyed for a notable period, greater or less, this comfortable intermission, until their gradual return gave proof of the dependence of my tranquillity upon the state of repose just passed away. Besides this, we have here the equable warmth of the bed-clothing, and the avoidance of all additional sources of disturbance to the animal movements. Let it be noted, however, that this remedy is far more likely to produce a beneficial effect in averting an accidental attack, one which is about to follow a transient exposure, than in preventing a participation in an epidemic influenza, whose diffused cause is ready again to assail us with an inevitable and irresistible energy.

I must be understood besides to confine these remarks exclusively to the forming stage of the attacks, and to promise most benefit from the management proposed when the cause has been transiently applied and is no longer allowed to act—a condition that we can never be secure of during an epidemic visitation of influenza.

I have said that with us, catarrhal fever, when developed, assumes promptly and most evidently, in the vast majority of instances, the inflammatory type, and of course, will require for its palliation and removal remedies of diametrically opposite character—measures of depletion and a regimen decidedly antiphlogistic.

It *may* be necessary in a young and robust subject to premise venesection; and this the more readily if the season be cool. Bleed then from a large orifice, and in a full stream, so as to obtain the most immediate influence upon the circulatory function, with the least actual loss of blood. It will very seldom be requisite to repeat the operation, but if the same symptoms, which indicated it, continue or return, while the pulse is firm and the strength unimpaired, we need by no means shrink from it.

The cathartic will now aid in reducing to its proper level the vascular excitement; while we derive from the head and throat, by determining to the gastro-intestinal surface. There has been some theoretical objection made to the combination of a diaphoretic with our purgative formula; but this is a nicety deserving of little attention in practice. We shall effect a very good purpose by the administration of some one of the neutral salts, with such a proportion added of tartarized antimony, as may induce general relaxation, slight nausea, and free diaphoresis. But if the tokens of gastric oppression and derangement show themselves prominently at this early stage, with nausea or ineffectual retching, and a tongue much furred, or of yellowish or brownish color, it will be best to commence the treatment with a mild emetic—of ipecac, perhaps—followed by a mercurial cathartic. The emetic is also definitely indicated, when there is a special degree of dyspnœa with, or without cough; when the mucous râle is loud and constant, and the complexion pale or livid. These are symptoms most often met with in children and old people. Quick vomiting, without depressing nausea, should be aimed at; the sulphates of zinc and copper are preferred by some in cases of notable feebleness; I choose mustard, alone or combined. In the medium class of patients, lobelia is a good emetic. In a large proportion of examples, we may derive best advantage from the exhibition of some mild diaphoretic, after the measures above recommended have been premised, the nitrous mixture, or the infusion of serpentaria, or the spts. mindereri with nitrous æther. The alkaline diaphoretic is well adapted to the cases of infirm adults, and young children.

As time advances, the more stimulant diaphoretics come to deserve a preference. Dover's powder, in full dose, must be given at night, with or without hot drinks; the carbonate, as well as the acetate of ammonia, is now useful; squill, paregoric elixir, and the nitrous æther, may be added in free doses. We may soothe the thoracic stricture and uneasiness, by the assiduous employment of warm fomentations and poultices, with or without mustard. These may be renewed or alternated, as circumstances shall require; but if there be a great relaxation of the surface with inordinate sweating, as sometimes happens, we may substitute dry heat, by laying about the thorax and to the trachea, bags of hot bran, salt, and the like.

If too early applied, the blister will, perhaps, annoy the patient and increase the general and constitutional irritation which is present, thus preventing rest and sleep. After proper depletion, these unpleasant consequences are not to be dreaded, and when well timed, it is capable of excellent benefit; suppressing, by prompt revulsion, the mingled tendencies to mucous and serous inflammation of the lungs, bronchitis, on the one hand, and pleurisy on the other. Nor is its good effects confined to the removal of morbid determination to the thoracic viscera; when laid upon the back of the neck, or between the shoulders, it often relieves the severe headache, so commonly associated with catarrh.

The frequent cough will, in a majority of cases, demand attention. It is apt to be exceedingly troublesome, augmenting the uneasiness and soreness of the air passages, which give rise to it, and increasing the force of reaction or general disorder, by depriving the patient of repose and sleep. For its palliation, there are proposed innumerable and strangely diversified demulcent drinks or cough mixtures, as they are usually termed. These have for their common basis some mucilaginous infusion or solution, as of liquorice, gum Arabic, flaxseed, elm tree bark, etc. etc., rendered expectorant, diaphoretic, and anodyne, by the addition of oxymel scillæ, vin. antimon., æther nitros, tinct. opii, etc.

The inflammation of the lining membrane of the frontal sinus and antrum maxillare, so often forming one of the incipient ailments of catarrhal fever in all its varieties, not unfrequently becomes, in its course, a prominent symptom, and sometimes remains tenaciously fixed, constituting, as I have witnessed in several instances, a singularly painful and indomitable tormentor. The strangest part of its history, is the disposition which it exhibits so strikingly and so promptly, to assume a regularly intermittent and periodical character. The patient, after suffering a day or two from what seems mere headache, notices that, soon after waking in the morning, perhaps comparatively comfortable, the nostril of one side, or, though rarely, it may be, both shall begin to feel full and obstructed; there is aching in the eye above it, under the eyebrow, and below it in the cheek and in the face: the head grows heavy, and light is avoided, and sound distresses; the voice is altered in a peculiar degree, and in a manner similar to that produced by frequent sneezing. These sufferings increase as the day advances, until they attain an intensity indescribable and unendurable, reaching their acme at noon, or an hour or two after it, then subside gradually—it may be, pass off altogether, and the evening and night are spent pleasantly, and in comfort. This paroxysm, which follows the quotidian interval, is by no means properly a febrile one, for the pulse is often little, if at all excited; there is no heat of skin, no gastric uneasiness. Yet the local affection is clearly inflammatory, for when it comes on in the morning, the face is apt to flush, the eye grows red and watery, and the nostril discharges often a considerable amount of purulent or sero-purulent matter, dripping slowly at first, increasing in quantity with the severity of the pain, and ceasing when that is relieved. From this, its course, the vulgar among us, commonly designate it by the title of "sun headache." It shows clearly, I think, in its periodicity, a tendency to observe the septenary, as well as the diurnal revolution. Of the cases which afforded, under my care, the best opportunity of observation, one terminated after seven paroxysms, one after fourteen, and one after twenty-eight. Holland notices it as neuralgia. Drake describes it well in a pamphlet in 1809, as "sun pain," or periodical headache.

I have found it singularly difficult to contend with. It has most frequently seemed to yield to the use of quinine, administered in free doses, but sometimes this plan has failed entirely; and I have known it bid defiance to the lancet, cups, and leeches applied to the temple, forehead, and back of the neck, purgatives, emetics, mercury carried to ptyalism, arsenic, opium, and epispastics. Hot fomentations, in which the head and face have been as completely enveloped as possible, and the milder diaphoretics, have seemed to palliate it in some measure, yet not satisfactorily. I have been surprised that so grievous a malady should have attracted so little the notice of the profession, few of whom speak of it at all. I have mentioned Drake as among those who have noticed it, and alluded to his graphic description, the earliest and best that I have seen. "It consists," he says, "of a pain in the lower part of the os frontis, of one side, commencing in the morning and continuing through a part or the whole of the day. There does not appear to be any inflammation in the pained part, and the arterial action is generally defective. It prevails more in the winter than in summer. It is generally sporadic; but in the winter of 1803–4, so many were affected by it, as to entitle it to the appellation of epidemic."

Lombard, of Geneva, treats of it as a "catarrhal neuralgia, complicating coryza," and manages it with opiate inhalations and fumigations. "I heat in the fire," he says, "a thin plate of iron—a shovel—and direct the patient to throw upon it a powder of opium, grains ij, with as much benzoin and sugar, in small pinches, holding the head over it so as to breathe the fumes through both nose and mouth. This is to be done two or three times a day, or oftener. It acts like a charm, frequently giving immediate relief."

Relief may also be obtained by inhalation of chloroform, but it is transient, and the pains soon return, perhaps with added violence.

The troublesome coryza has not been neglected. Williams proposes to arrest it by what has been called dypsopathy. He refuses the patient for 36 to 48 hours, or even more, all fluid, except perhaps a teaspoonful or two. Under this restriction the secretion ceases, the acrid dripping dries up, and the local irritation subsides. Yet I have seen this plan entirely fail. In the opposite extreme, hydropathists boast of effecting sudden cures by cold douches to the head, with wet cloths over the face and cheeks, and abundant draughts of cold water.

It is affirmed, at least, in the early stages, to be amenable to local applications. Astringent injections are thrown up the nostrils; a solution of sulph. zinci is proposed by one physician in the proportion of grains iij to an ounce of water. Another suggests as more efficient the use of the nitrate of silver in the same manner, in a solution of as great strength as can be borne, without too severe irritation.

Lombard also employs "amadou soaked in laudanum, and burnt under the nose of the patient."

A blister applied to the back of the neck, or two smaller ones behind the ears will, as I have seen, occasionally make a favorable impression, both upon the violence and the tenacity of this tormenting malady.

It is proper to add some brief observations upon the management of catarrhal fever, as it occurs among young children and infants. In these, the derangement of the mucous membrane of the alimentary canal often becomes of paramount importance, and our attention must be more unremittingly and peculiarly directed to the condition of the abdominal viscera, though we are by no means to lose sight of the respiratory disorder. From the earliest stages of such attacks, it is necessary to have recourse to some one of those cathartic formulæ with which we can best keep up a gentle and continued action upon the bowels. Combinations of rhubarb with the carb. and sulph. magnesiæ, and with the carb. potassæ, adding some aromatic to prevent griping, are in very general use. If there be diarrhœa and dysentery, both which complications may present themselves, some anodyne and astringent formula will be required, as the cretaceous mixture with tinct. kino and elix. paregoric, or the acet. of lead with acet. morph., in small doses, cautiously adapted to the age and condition of the subject. If there be determination to the head, and convulsions threaten, the hair should be cut close, and cold affusion applied, while the extremities are warmed and reddened by the hot bath or sinapisms. Dyspnœa, with urgent cough, especially if the harsh ringing sound, premonitory of, and attendant upon croup, make itself heard, will demand a quick and active emetic and immersion in the warm bath; these remedies may be required to be repeated many times during the progress of the case, by the return of the symptoms. Indeed, they are both of them more generally applicable in the treatment of our infant patients, than the above directions would seem to imply. An emetic of ipecac. or the sulph. zinci, will disgorge the lungs of the thick mucus which the child knows not how to spit up; and the warm bath, which might, perhaps, be advantageously employed in the general management of catarrhal affections, must not be neglected in the very young. In these it is our best means of equalizing the irregularly diffused excitement, determining to the skin, and relaxing its vessels; it diminishes the tickling in the larynx and trachea, and subdues the disposition to cough; puts a stop at once to nausea and retching, and abdominal pains; and often relieves happily, by an indirect anodyne influence, the general uneasiness and suffering; procuring, or aiding strongly to procure, a calm and tranquil sleep.

The cough is best controlled by the combination of some anti-spasmodic and alkali with small doses of anodyne. Indeed, it is well to introduce into all our formulæ some one or other of the alkalies, for the purpose of neutralizing the acid, which is, for the most part, so predominant a quality of the secretions of the gastro-intestinal surface. I employ the factitious musk (ol. succini with acid. nitric) with the carbonate of potass. and the tinct. camph. opii. The alkalies act also as diuretics, and are thus useful depuratives or eliminants. I need not say that the convalescent child should be warmly clad, and be protected from all undue exposures.

We are not likely to meet often, in this country, with the typhoid variety of catarrhal fever, so familiarly referred to in the writings of our European brethren; but occasional instances, occur, in which, from some peculiarity of constitution, or protraction of exposure, debility forms a prominent feature. In exquisite cases of this sort it is necessary to commence the treatment with the liberal use of stimulant diaphoretics. The pulse is low, quick, and feeble; the respiration hurried and embarrassed; depletion, in all the ordinary modes, is absolutely forbidden.

The volatile alkali is here of admirable utility, and must be prescribed in full doses; camphor, nitrous ether, wine and ardent spirits, must be freely used, and o [illegible] ot be neglected. The surface must be excited in the meant [illegible] ot applications—fomentations, poultices, stimulating frictior [illegible] stard and turpentine, and ammoniated embrocations and l [illegible] Epispastics may be directed at such intervals as to keep up by [illegible] ion a constant irritation from [illegible]em.

[illegible] the pulse rise and the usua [illegible] mmatory affections become gra[illegible]y developed, we must r [illegible] th caution, to some moderate [illegible]logistic measures. Of th [illegible] best and most useful and safest [illegible]be the combination of a [illegible] e or mild purgative with the [illegible]phoretic; and the mercuria [illegible] ps, deserves a preference; if [illegible]w, it may be aided by enema.

In all catarrhal attacks, the chamber of the sick must be kept at a regulated and uniform temperature; in winter, above 60° of Fahrenheit, while at the same time it is to be well aired. The best means of procuring this thorough ventilation is, during cold weather, by lighting up in the chimney a constant, but moderate fire; in summer, by throwing open doors and windows, carefully placing the bed, however, so that there shall be no current or draught of air directly upon or across his body.

The only remaining individual in the class of idiopathic fevers is the disease so widely prevailing at times over the North American continent—its eastern portion especially, and generally recognized among medical men under the title of

PNEUMONIA TYPHOIDES.—There has been much controversy as to the nature and character of this strange malady, and many names significant of this diversity of opinion have been given to it. Every point in its history has been made matter of dispute; it was long undecided whether it is a new disorder or a modification of some of the better known and more ancient shapes of disease; some writers refused to arrange it at all under the head of fever; and there were warm and interminable debates as to its origin and mode of propagation.

The study of this singular affection is peculiarly interesting and instructive. It demands our attention from the fact of its not unfrequent sporadic occurrence during our winters, in some of which, when severe, it has indeed seemed, even within a few years back, disposed to resume its earlier epidemic sway. Its appearance is always productive of anxiety and alarm, from the menacing aspect it puts on, and the real terrors which attend it; and its proportional mortality has been, in many places, seriously great. It is distinguished by its extreme liability to undergo modifications of history, symptoms, and results, of every diversity of circumstance, constitution, and locality. Indeed, such influence have these contingencies exerted upon its very characteristics, that it is not easy to recognize it in its several mutations, and it is only by carefully collating the numerous notices of it which have been published, that we shall be able to trace it through these striking changes, and satisfy ourselves that such almost contrasted pictures are intended, indeed, as portraits of one common pestilence.

It is of little consequence to decide whether this is a new disease or a mere reappearance of the ancient febris petechialis; it certainly put on, when first it attracted attention, many unaccustomed features, such as caused it to be regarded by the eastern physicians as an unknown affection—one which it was difficult to recognize as described in previous medical histories.

In some of its forms it so closely resembles catarrhal fever that many have been disposed, on this account, to deny it a separate existence; in others, it seems almost merged in the severer grades of typhus; some writers conjectured it to consist in a hybrid combination of these modes of disease, who nevertheless considered it, like a mongrel fruit, or flower, or animal, to be distinct and peculiar, demanding its own proper name and its own specific management. In its invasion there is an indefinite uncertainty as to the organ or part which is to suffer primarily, or upon which the chief force of morbid determination shall be directed. Thus the brain, the throat, the lungs, the heart, the stomach, the intestines, might each, in turn, become the centre of diseased sympathies. The functions of the viscus thus assailed, are frequently put a stop to at once, and its very structure not uncommonly found to have undergone rapid and striking deterioration.

Sometimes, the sympathies brought into play are of the most indirect and obscure kind; the whole local affection is fixed or concentrated upon some remote or comparatively unimportant portion of the body or limbs, and the patient may sink and die complaining of nothing but a painful or distressing sensation in the part so affected. These circumstances were in the highest degree calculated to throw round it a veil of gloom and mystery, which might well thrill the hearts of the stoutest with awe. No one was safe, and each might be seized in this insidious manner; the springs of life might be dried up while the stream was flowing most purely and freely. Rumor, of course, magnified infinitely the number of this class of cases.

I have said that this malady was specially liable to be modified by circumstances. Thus, while it scarcely differed from ordinary catarrhal fever in some situations, in others it appeared little more than a violent inflammatory congestion of the lungs—like the "lung fever" of the Eastern States; and in others still, the chief symptom was a pulmonary congestion, little or not at all inflammatory, resembling

ometimes received the denomination of pulmonary apoplexy.
icts, it was ushered in by a chill, long protracted, ex-
ressing, and, indeed, in many cases fatal, whence it received
on title of "cold plague." At its commencement, so many of
presented a cutaneous eruption, or the occurrence of pete-
hat the vulgar called it a "spotted fever," and the learned a pesti-
yphus, or, as I have said before, a return of the old febris pete-
It is strange to find how soon in its progress it lost that
even in the very localities where it had been most marked.
he numerous denominations affixed to this proteiform disease,
cted the one which has received the most general sanction
men in the southern and middle States. In a large ma-
the cases which I have see the different sections of our
d at different periods, as been an inflammatory affec-
thoracic viscera, ass vith that impairment of senso-
nd morbid state of the vascu action which we meet with in
s or typhoid fever. It is, ther , I think, very properly styled
oid pneumonia. But it is no nere pneumonia; for not only
affection of the respiratory ans occasionally wanting, and
nmations and congestions of ot parts substituted, but in a very
ous order of instances, the pec and characteristic disturbance
sensorial and circulatory syst has been of such paramount
tance as to have determined p nptly the fatal event. Hence
ot hesitate to regard it as an id athic fever; the correctness of
opinion could only have been ubted by those who make hot
skin and vascular excitement essential standards or diagnostic marks
of fever.

Some have been disposed to arrange it as a true pulmonitis, among the diseases of the respiratory system; but this error can readily be shown to have arisen from a narrow view of the facts. I have already said, that in many instances the fatal progress of the attack has been determined without any definite relation to local affections of any kind, and surely we shall find some of the worst and most malignant invasions of this epidemic divested of special reference to the lungs or their appendages; some affecting the brain and spinal marrow, others being simply anginose, and a third and somewhat numerous class, altogether anomalous, probably depending upon a morbid impression simultaneously made upon the whole sensorial system in all its wide expansion.

The first notice we have of its appearance was in the year 1806, in Medfield, a town of the State of Massachusetts, whence it spread gradually—extending itself, winter after winter, throughout Canada, and the Middle States, progressing from village to village, and from one portion of the country to another, until in 1813, it had reached Philadelphia. In the winter of 1815, it first prevailed in the Carolinas, and was then, and more widely in 1816, epidemic; since which time its ravages at the South have been slight. It continues to show itself sporadically, everywhere I believe, where it has once found footing. We scarcely pass a winter without meeting with instances of it, especially among the black population.

During the season just past (1854), and especially since the variable weather of spring commenced, many cases were met with along our sea coast. I have seen one recently in consultation in which there was the most remarkable combination and intermingling imaginable of the distinctive and characteristic symptoms of enteric fever and of pulmonary inflammation. On the one hand there was cough and very much hurried respiration, with bloody sputa, and loud sibilant and mucous râles—a dyspnœa urgent and most annoying; with meteorism on the other, and a frequent and troublesome diarrhœa, red tongue and thready pulse. This patient recovered, but with great difficulty.

The winter and early spring seem to be the almost exclusive seasons of its occurrence, yet exceptions do happen, for I have seen two distinct cases of it during the summer, in June, 1838, one in a white female, and the other in a black man. From the gradual extension of the disease, in which it is strongly contrasted with common influenza or epidemic catarrh, many have been disposed to infer its propagation by contagion; but of this doctrine the proofs are not clear. Nor do we know distinctly its mode of origin. It has certainly some relation to the sensible qualities of the atmosphere—as its dampness and coldness, and occurs most obviously in those peculiarly exposed to these agents, especially if the exposure be protracted. Blacks are observed to be peculiarly liable to its attack. Children seem to enjoy a special degree of exemption.

It must, I think, be remarked as a singular fact that the pneumonic or pulmonary form of the disease is far more universally prevalent in the southern than in the northern districts in which it has appeared. It is in these latter, contrary to all reasonable expectation, that the anomalous and irregular varieties have been met with most frequently. In New England it has also been observed, that it is much more violent and fatal in low, swampy regions, in the neighborhod of bogs, mill-ponds, etc., as if it depended, in some measure, upon malarial influences; while in our own miasmatic low country, equally damp and vastly more subject to malarious fevers, nothing of this sort has been noticed.

The petechiæ on the surface, which were at first so prominent a symptom as to give both name and character to the malady under discussion, soon ceased to attract attention, and may be said hardly to have belonged to it when it reached the country south of the Potomac. Yet this was not merely the effect of modifying influences of climate, for they had before this time, as it is affirmed, failed to exhibit themselves in cases occurring in the native localities of this strange pestilence.

Until quite recently, none but American writers seem to have noticed this form of disease. The first transatlantic physician who speaks of it is Dr. Stokes. It is very well described by him under the title of "typhoid pneumonia," as not uncommon in Ireland. Dr. Burne, of the Westminster Hospital, mentions that a great many cases of what he calls the "spotted fever" were brought into the hospital early in 1838. It is, he says, "an adynamic or typhus fever, combined with a latent and dangerous pneumonia, and exhibiting on the surface a very regular and spotted eruption—not petechiæ."

Causes.—I have already stated the undisputed relation between the occurrence of occasional cases of pneumonia typhoides, and the damp, cold atmosphere of our northern winters. But we cannot thus satisfactorily account for its origin where the same causes had previously existed without producing it, nor for its spreading into more genial climates, nor for its gradual or continuous progress in various directions, from its first seat. On these points we must acknowledge entire ignorance. I have personally seen no proofs of its contagiousness. It is usually spoken of as epidemic, and as dependent upon some unknown qualities of the air. A predisposition to it arises from all those contingencies which effect considerable or permanent depression of the vital energies, such as a damp, low, ill-ventilated dwelling, insufficient food or clothing, labor beyond the strength, or continued fatigue. Its exciting causes are such as induce catarrh or pleurisy; exposure to cold, especially if long protracted, sudden vicissitudes of weather, or striking and hasty contrasts of temperature, getting wet, etc. etc. It is asserted to show a remarkable disposition to attack adult males of middle age, we know not why, in preference to women, or the very old or young, yet there is no absolute immunity for any class of subjects.

This pestilence affords us a strong exemplification of the general and prevailing force of predisposition or predisposing causes in modifying the form and character of disease. The variety of shapes which it assumed, and the uncertainty which attended its progress from place to place, were beyond all precedent. The condition of constitution of the individual attacked, the situation of his residence, his habits of life, and an indefinite number of analogous circumstances, stamped their influence upon every invasion of this epidemic, and still continue to determine, from time to time, a sporadic attack of greater or less severity.

Symptoms.—In attempting a delineation of so cameleon-like a malady, we must portray separately and in succession, the several modifications presented in different places, and under various contingencies. The most ordinary form of pneumonia typhoides—that which was at any rate far most frequently met with in the southern district of our country, is ushered in by a chill of uncertain intensity and duration, very often, however, exceedingly protracted. This is accompanied, or followed by extreme pain in some part or parts of the body—usually the head and chest. A notable prostration of the muscular strength attends almost universally, with general uneasiness and restlessness. In a very large majority of cases, there is some dyspnœa, with cough, which aggravates greatly the thoracic pain; sometimes stricture and oppression of the breast are complained of. The respiration is hurried, uneasy, and irregular; there is deep and heavy sighing; a weight is felt at the præcordia, with nausea, gastric distress, and it may be vomiting. The tongue is clean, but red. The pulse is small, quick frequent—not capable of bearing much pressure. The spirits are much dejected; in many cases there exists, from the commencement, a degree of delirium, which sinks gradually as the patient grows worse, into the low muttering, characteristic of true typhus. The temperature of the surface is irregular and unequal; the skin is sometimes harsh, hot and dry; at others it is relaxed, cool, and clammy; I have often seen it continue from day to day, little altered from its usual condition and warmth.

If the patient be not relieved, the typhous symptoms become aggravated, the tongue dries and chaps, or is covered with a dark crust; the teeth and lips are foul, and the whole lining of the mouth incrusted with tenacious sordes; the previous restlessness and pervigilium are exchanged for stupor and coma; the pulse becomes weaker and undulatory; the breathing is more and more difficult; and death ensues at a very uncertain period. Or about the ninth, tenth, or eleventh day, the pulse rises, becoming more voluminous; a soft, warm moisture bedews the surface, the delirium subsides, and the sick man slumbers pleasantly and wakes more cheerful; the cough is less annoying; the thoracic pain and dyspnœa gradually yield to a full and easy expectoration, and a slow recovery comes on.

Such is a description of the most common, most manageable, and least fatal variety of pneumonia typhoides. Yet our *prognosis*, even in this class of cases, is somewhat doubtful, and requires to be cautiously regulated by the circumstances of each individual example. As in typhus, all those tokens which go to show any increase of nervous prostration, or any farther impairment of vascular energy, are unfavorable. Among these, are great anxiety and dejection of mind, or the opposite extreme of inattention and indifference; constant restlessness or peculiar feebleness; want of susceptibility to external impressions, as from sinapisms and blisters; sighing, or frequent yawning; or any other mark of increased thoracic oppression. Percussion of the thorax in such instances, returns a dull sound; and there is imperfect respiratory murmur. Lividity, or dark complexion of the countenance; petechial spots on the surface; a fixed state of the pupil of the eye, whether contracted or dilated; the exhalation of a cadaverous odor, and frequently coma, precede dissolution. On the other hand, the renewal of attention to surrounding objects; the return of intelligence, of cheerfulness and hope; fuller and freer breathing, with improved resonance and respiratory murmur, moderate expectoration, a pulse slower and more voluminous; more equable warmth of surface, with a tongue paler and moisture, give presage of recovery.

The duration of such attacks as these will average from six to ten days.

The next most common form of pneumonia typhoides, resembles much, in its onset, the "bilious pleurisy" of the southern portion of our country. There is pain in the chest, usually sharp and cutting, rendering the respiration short and difficult. There is great gastric oppression, frequently with retching, and vomiting of foul, mucous and bilious secretions. The countenance is flushed, the eye red and watery; there is aching of the head, back, and limbs; the pulse is full, but unduly soft and compressible, soon becoming feeble and losing its volume. The stage of vascular excitement is short; muscular prostration soon supervenes, and the circumstances of the patient become very similar to those described in the first instance.

It has happened to me to meet with several impressive examples of this disease, in which the principal symptom was a peculiar pulmonary congestion. Some diffused uneasiness throughout the chest is complained of, but no acute or severe pain. Dyspnœa attends, which soon becomes urgent; the pulse is usually very frequent; the strength fails, the skin is covered with a clammy sweat; there is little or no febrile excitement; the tongue is moist and clean; extreme anxiety and fear of impending death oppress the patient, with restlessness and inability to sleep.

The *prognosis* in such cases is very unfavorable. On exploring the chest, the respiratory murmur will be found almost inaudible, in a great portion of the lung, either of one or of both sides, and the resonance lost in a similar way and extent. I have seen a stout young man die in about six hours from such congestion, and a young woman sink in less than eight, in spite of the most energetic and best directed efforts for their relief.

These may, perhaps, be considered the more regular conditions of the disease of which I am treating; but my delineation of it would be unpardonably imperfect, if I failed to notice its singular anomalies. These, I have already said, were often very obscure and unaccountable, and excited, during the prevalence of the epidemic, a degree of alarm, which, to one who now peruses coolly the histories of such cases, and reflects on their comparative rarity, seems altogether groundless. A moment's consideration will suffice to convince any one, however, that such panic was natural and not unreasonable. Stories were every day circulated, subject to the indefinite exaggerations of common rumor, which were based on facts truly impressive. Some of the victims of the pestilence were struck down while at work in the fields, and died before their friends could convey them home. Others again seemed to be taken off by the most inadequate ailments, "dying," as the phrase was, "of a pain in the foot or knee—in the ankle or wrist."

A singular variety of the epidemic is described in the "Report of the Committee of the Massachusetts Medical Society," as occurring chiefly or exclusively among females, where the symptoms were, "universal deadly coldness, the skin as white and smooth as polished marble, the countenance perfectly placid, not one distorted muscle, the pulse imperceptible at the wrist, respiration only by gasping, and that not frequent." I know not in what language could be conveyed a more graphic picture of exquisite congestion—intense and perfect capillary paralysis.

Of all these irregularities, however, the most malignant are the anginose cases, those in which the throat is the part affected. These are fortunately rare, and have been met with in greater number in the middle States, Pennsylvania and Maryland, and the northern portions of Virginia, than in the eastern, western, or southern sections of our country. The attack is insidious. The patient seems to labor under mere catarrh, with slight cynanche, but, on a sudden, respiration becomes much impeded, and great prostration of the universal system supervenes. The throat and fauces are found to be of a dark brownish or mahogany color. The exhaustion of the vital powers is usually represented by those who have had the misfortune to meet with instances of this kind, as singularly prompt and uncontrollable.

In the winter of 1846 and 1847, the Palmetto Regiment of South Carolina Volunteers was called into service at a most inclement season, unprovided with a proper camp equipage, without arrangements for hospital attendance, without physicians or surgeons, without medicine or hospital stores. In this condition, exposed in tents to the rough weather, on a bleak unsheltered plain, they fell sick in great numbers, and suffered extremely. Several died within a short time. They were attacked with pneumonia typhoides in a great variety of forms. The Chester Company was most roughly handled, consisting of men who had almost all of them been more or less affected, the past summer and autumn, with malarious fevers, which prevailed that year with unprecedented universality throughout their district. The fever which attended was both of the enteric or typhoid character, with tympanitis and diarrhœa, and of typhus form, with dark maculæ and cerebral determination, neither diarrhœa nor meteorism. One patient, a black, died in a few hours after the commencement of the attack, having had a violent convulsion, followed by coma. Paralysis of the bladder was not uncommon, requiring the urine to be drawn off for some days. The right lung was the seat of almost uniform inflammation; delirium was early and almost constant; the prostration of strength very great; the duration of the cases averaged about a fortnight. One case was attended with interesting complications. Besides the ordinary symptoms, he was assailed after a few hours with incomplete paralysis of one side, which was affected with pain, quasi rheumatic, and of the muscles of deglutition. He swallowed with difficulty, and with menaced suffocation, through the whole course of the disease, and died on the 16th day. The notes of the autopsy, made by Dr. Cain, read as follows: "The pericardium was inflamed and thickened; its cavity contained about two ounces of reddish serum. Heart, covered with false membrane, soft, and easily removed with the scalpel. Substance of heart, pale, soft, and flabby; walls of ventricles thin; valves sound. Left lung, upper lobe healthy, except a small extent of the lower portion, infiltrated by purulent matter. Srong adhesions of lower lobe with costal pleura and diaphragm, strongest near the spine; here was an abscess of the size of a hickory nut, with extensive purulent infiltration in the lower third. Pleura highly inflamed. Right lung, strong pleural adhesions; purulent infiltration through the whole lung; in the upper part, with some appearance of small abscesses. Liver much enlarged and congested. Spinal marrow, substance healthy; slight fulness of arachnoid vessels at the second and third dorsal vertebræ."

I will insert here an extract from an unpublished account of this disease, written by Dr. Browne, of North Sandwich, New Hampshire, with which I was favored by his son, Dr. P. B. Browne. It is interesting on many grounds, but especially as showing how greatly the malady varied in different places, and as exhibiting some of its peculiar anomalies. "The epidemic broke out in his neighborhood, a healthy farming country, in February, 1815. He lost two brothers during its prevalence. There was nothing unusual in the season; the winter had not been uncommonly severe. It was not known how it commenced; it could not be traced to any mode of communication. It was denominated spotted fever.

"Children were quite subject to it. The youngest, who died, was a child of seven months old; it lived but five hours from the attack. Other children died eight years old, ten, and fifteen years. The average duration was from twenty-four to forty-eight hours; some survived three or four days; one lived a week.

"In 1816, the neighborhood was again visited by 'spotted fever.' A child of six years of age had it, and recovered with total blindness. She is now living (1850). The attack was ushered in generally with a chill, succeeded by very severe pain in the head; sometimes a severe pain in the head, or in the hand, or foot, was the foreboding symptom. The skin was hot and dry, the respiration embarrassed; there was great muscular prostration, with irregular pulse; the tongue was dry and clean. Delirium was very common. Most violent vomiting at the commencement of the attack was also a common symptom; and some suffered from total blindness for a time. The invasion was very sudden—while the subject was at work, walking the road, at church, etc.

"In the 'Report of the Massachusetts Medical Society,' females alone are mentioned as liable to the 'lethargic attack.' A case occurred here in a male. The patient was a young man, aged nineteen years. He was taken ill during the night; the next morning he fell into a lethargic state, and remained so for twenty-four hours; it was impossible to rouse him; he lay like a person in a very sound sleep, taking neither medicine nor nourishment, nor had anything to pass him. A deadly paleness and coldness were over his whole body; pulse scarcely perceptible, or quite gone at the wrist; heart's action scarcely to be felt; respiration frequent and catching, with an occasional sigh. He came out of this state, recovered his senses perfectly, but died in forty-eight hours after he was taken ill.

"All the patients were very much spotted. One child recovered without any treatment."

The actual mortality of pneumonia typhoides has been very differently represented by different writers. After a careful collation of the several histories published of its prevalence at various times and places, I would not compute the deaths at more than one in ten on the whole—an inferior proportion to that of the more serious forms of typhus in many parts of Europe—to that of yellow fever, or of the plague, or of Asiatic cholera.

The convalescence is almost always slow, irregular, and for a long while, imperfect; yet when once attained, it has not struck me that the constitution has been permanently impaired, or that any notable predisposition has been generated or aroused to any other form of disease.

Autopsy.—The morbid appearances after death correspond generally with the character of the fatal attack. In the more ordinary cases, the thoracic viscera having borne the force of the invasion, exhibit most obvious traces of its sway. The lungs are solidified or hepatized, heavy, and of a dark-red color—the vessels both of the pleura and lining mucous membrane engorged, with adhesions of the pleuræ. The heart sometimes shows the effects of inflammation, presenting on its surface flakes of organized lymph.

The brain is usually more or less altered in appearance, its vessels filled with dark blood; and effusions of serum, of coagulable lymph, and even of purulent looking fluid, are occasionally found on the surface of the membranes, in the ventricles, and even, it is said, within the cerebral substance. The blood is, as in typhus, of a particularly blackish hue.

Treatment.—Concerning no individual in the long catalogue of human maladies, has there been more division of opinion in this regard. While some physicians, of the highest standing, vehemently condemn all evacuations, and every mode of depletion as eminently injurious and even fatal in their tendency, others, of perhaps equal respectability, inform us that the most active antiphlogistic measures are peremptorily demanded, and, indeed, absolutely essential to success. It is only by keeping in mind what has already been stated, as to the very great diversity of character assumed by the disease at the various periods referred to by writers, in the several districts of country which it invaded, and in the different constitutions which it assailed, that we shall be able to comprehend, or in any degree to reconcile, these contrasted sentiments. We must here, as in all other analogous cases, govern ourselves by those general principles which experience and reflection have proved to be adequate to our guidance; making due allowance, in our application of these principles, for all the modifying circumstances observed to be present and acting.

The pneumonic form of this epidemic has hitherto been the most common in our southern region, and it is the type which we will, from time to time, be likely to meet as occurring sporadically. The thoracic distress, the pain so often felt—the difficulty of respiration—these well known symptoms of pulmonary inflammation and congestion, will at once suggest to us the familiar remedy so often tried and so justly relied on in cases apparently analogous, venesection. We will be struck, while perusing the papers from various sections of the country, to find so much more testimony in favor of the lancet from southern than from northern practitioners, and will be led to infer, that the typhoid character of the pestilence was much the most strongly pronounced in the colder climates, while the local inflammatory affections were more prominent in lower latitudes. Such, indeed, I suppose to be the fact, for we are well aware, that our eastern brethren are by no means timid phlebotomists. They are, however, at least in the earlier documents, almost unanimous in deprecating the resort to bloodletting, as attended with the greatest possible risk.

On the other hand, there are in the Carolinas, many physicians who
ost invariably commenced the treatment with venesection. Dr.
nt, of Richmond, Va., states that he bled in this disease more co-
usly than he had ever done before. He tells us that he took from
ny patients, with the happiest effect, from twenty-five to fifty ounces
blood at on e, and sometimes repeated the detraction to nearly the
amount. The blood, he says, was always cupped and sizy.

the cases that have occurred to myself, the lancet has been seldom
r ed or admissible. I have employed it more than once experi-
lly, in my anxiety to give relief to pulmonic pain and dyspnœa.
me of these instances, a certain degree of advantage seemed, in-
to have been gained, yet though I proceeded with much caution,
ad selected t ppearing to be well adapted for
rial of this remeuy, out ding a resort to it, the conse-
nt prostration was in each alarmingly great, and difficult
he patient to recover from.

is true that we have here a nequal distribution of the cir-
ng fluids—the force of m vascular determination, too, is
n upon organs of vital imp e. Yet these local determina-
are of peculiar character, a ust be regarded as congestive
than inflammatory.

fluids," says a northern w 'are too stagnant to be drained
venesection." Indeed, thi engorgement, of whatever set
s, is often so tenaciously ate, that it does not seem to be
in any degree, by wh subtraction from the mass of
blood, while the general system is promptly depressed, and if great care be not taken, irrecoverably prostrated.

In some instances it has been proposed, on account of the difficulties which embarrass us, "to give cordials and open a vein at the same time." Yet, with all these efforts at obtaining the beneficial influences of bloodletting unalloyed by its injurious tendencies, the general result of the practice is not such as to encourage us to place any dependence upon it.

Of course I must not be understood as offering any objection to the use of the lancet in attacks marked by a predominance of the tokens of obvious inflammatory excitement. I have not a doubt that this was the general character of the epidemic in those localities whose resident physicians report the success of a free and bold resort to the antiphlogistic regimen in its full extent.

I have been much pleased with the effect of the early administration of an emetic, or an emetico-cathartic, where the case is seen at its commencement. A very common formula is the combination of tartarized antimony, or of ipecac, which I prefer, with calomel;—the domestic mixture of sal Epsom dissolved in a strong infusion of seneka or serpentaria with the same emetics, may also be used.

By the double action of these prescriptions we not only cleanse thoroughly the stomach and intestinal canal, a step which experience has shown to be of great importance, but we effect the paramount object of creating a centrifugal tendency of the fluids and determining energetically to the surface. We thus most safely and effectually remove the local congestions which constitute the most serious and characteristic portions of the disease, and restore the impaired equability of the circulation. This remedy, however, the emetico-cathartic, is obviously unsafe, and must not be trusted to in some of the more exquisite examples of early prostration and extreme muscular weakness. In such cases we resort at once, without previous employment of any means of depletion, to the moderately stimulating diaphoretics, under which head we find our second class of measures, when we have premised the emetic and cathartic. Of these, camphor, nitrous ether, the carbonate and acetate of ammonia are the best, and are made more beneficial by combination with opium, and especially with Dover's powder. The efficacy of all these will be much aided by pediluvium, and by the application of warm fomentations, poultices, and heat in various forms to the surface of the patient. Cataplasms with mustard must be laid over the chest, if pain or dyspnœa are present, and applied to the wrists and insteps. Epispastics are also of use here, by their double power as stimulants and revulsives; the back of the neck, if the head be affected; the sternum and epigastric region, if the lung or heart, or stomach suffer, should be selected for their application. There has been some dispute as to the preference due to the dry or moist form of heat, as the best to be resorted to in this disease. It is, I think, easy to decide. If the skin be dry, I prefer fomentations, or even the vapor bath; if moist, I prefer bottles of hot water, heated bricks, bags of hot salt, chaff, etc. Sweating will, in the greater number of cases, come on readily, but must be regulated. If too profuse, and kept up for too long a time, it may prove injurious and debilitating. We restrain it by substituting dry for moist applications, and removing some of the bedclothes, and changing cautiously the body linen of the patient; dry garments, carefully and well aired, being put on in place of those moistened by the cutaneous discharges.

If the strength seem to fail, our stimulants must be used more freely—the vol. alkali in large doses, from 5 to 10 grains every half hour or hour, with wine whey or brandy toddy; spts. nit. dulc., spts. turpentine, the tincture of cantharides, may be given alternately or in combination. I can set no limit to the administration of this class of remedies, but the excitement of a notable degree of reaction, which, being observed, will guide us in the future quantities to be exhibited; taking care, however, that the patient shall not suffer by their timid or inefficient amount, nor be allowed to retrograde by any sudden subtraction of dose.

Where the pulmonary congestion is intensely great, our task will be difficult. I scarcely know a case in which our ordinary medicines produce less effect—the lancet is inert. Fomentations and poultices, made irritating by mustard, must be applied assiduously about the chest. It will perhaps be advisable to resort to the spts. terebinth. in large doses, or to depend upon the free exhibition of camphor in substance.

In the form of pneumonia typhoides, which so closely resembles the bilious pleurisy of the South, when the symptoms of gastric distress are combined and prominent, a mercurial cathartic should be first prescribed, and the bowels kept afterwards moved for some time with a solution of sal Epsom in the infusion of seneka or serpentaria, as revulsive and sudorific. If the retching and vomiting are troublesome, and refuse to be controlled by the effervescing draught, lime-water, and mustard poultices to the epigastrium, I would advise opium, in small doses, and a blister to the scrobiculus cordis.

The mercurial treatment has been highly recommended by many writers, and among others in the very able Report of the Committee of the Massachusetts Medical Society, in 1810–11. If ever applicable, it must be under such conditions as we are now considering. Stokes speaks very favorably of it in his account of the Dublin epidemic; and I have seen it prove admirably beneficial. Many of the treatises upon this strange disease are filled with eulogies of opium; a remedy which seems to have been ap t almost every stage, in every modification, and in every lo re it prevailed. Its full and free use has, in my own hands, universally required, and productive of so much relief and co to the suffering sick, as con- ntly to recall to my memory sincere acquiescence in their priety, the forcible expressio he older writers concerning it, re they styled it, "divinu dium! magnum Dei donum!" e is, indeed, no substitute no second to it in the materia a. It alleviates the oppres lyspnœa so often present, pro- es the expectoration of the , ropy mucus effused in the gs, diminishes the anxiety an ection of mind which harass patient, often restores reason the delirious, determines to surface, gives new vigor to the irculation, and re-excites the nervous energy. It alone possesses the power to control the troublesome retching and vomiting sometimes present: to calm the incessant and insupportable restlessness of the sufferer, and procure for him a tranquil and quiet slumber, that most delightful solace of the sick and afflicted.

It was, as we are told, the only means found to be of any efficacy in the lethargic and other anomalous and malignant cases formerly described; and the doses which are affirmed to have been exhibited with advantage in such attacks, are prodigiously large. It is stated in the *Massachusetts Medical Journal* (vol. ii. p. 149), that from fifty to one hundred drops of the tinct. opii have been given every half-hour with success. In one case mentioned there, a scruple of solid opium was taken in the course of three hours; in another, forty-two grains in forty-eight hours. When deglutition was impracticable, the best results have followed its free exhibition in enemata.

In my own practice, these enormous amounts have never been required; I have obtained the most unequivocal benefit from the medicine in the usual doses, freely but cautiously adapted, and repeated with a frequency proportioned to the exigencies of the case.

I have met, happily, with no example of the terrible modification affecting the throat with malignant inflammation, and termed "anginose." In these, it is advised to apply a blister to the front of the neck, which must be kept open and discharging. Besides this, and in addition to the other stimulants and diaphoretics above recommended, I should be disposed to employ, as in cynanche maligna, the infus. capsici, in free quantities, as a drink, and use it abundantly to wash the throat.

It is well to be reminded, that in this strange disease, it is never permitted to despair of our patient, recoveries being in considerable number recorded, from circumstances the most deplorable, and in deed, to all reasonable anticipation, absolutely hopeless. The convalescence is so slow, difficult, and irregular, as often to require unremitting continuance of our care and attention. We must subtract gradually from the amount of stimulants which have been given him, and substitute, in their stead, the more permanent tonics. Of these, each practitioner has his favorite. Arsenic is preferred by many of the New England physicians, and is, without doubt, highly serviceable. The muriate of iron is also spoken of as well adapted. I am in the habit of trusting rather to cinchona, combining it in infusion with serpentaria, to which I add a small proportion of carb. potass. and tinct. opii camphor.

The convalescent should wear flannel next his skin for some time. His clothing should be carefully adapted to the season, and he should avoid, with especial prudence, all exposure to moisture, and to sudden alternations of temperature.

SYMPTOMATIC FEVERS.

Having gone through, in sufficient detail, the consideration of the idiopathic fevers, properly so called, I proceed to make a few observations upon those which deserve, by way of distinction, to be regarded as symptomatic or consecutive. I enter upon this topic, which will not occupy us long, the more willingly, on account of the opportunity afforded us of marking the obvious differences which so widely separate the two classes. We will thus be satisfied, I think, better than by the most labored argument, of the practical absurdity of confounding these two modes of febrile disorder; the one obviously connected with local injury, derangement, or irritation, of whose existence, and the influence exerted by it, in the production of the constitutional disturbance, and their necessary mutual connection and dependence, there are the most clear, and pointed, and unequivocal proofs; the other, inferred to be similarly connected with, and dependent upon a like irritation or derangement, whose seat and nature are both matters of obscure conjecture; and this inference merely founded upon a doubtful and disputed analogy.

Symptomatic fevers may be divided into the continued and intermittent; none of them assuming, so far as I know, a fairly remittent type. They may arise from causes, both external and internal. They may, in both forms, be connected with the same local excitement; and in such cases, the continued will be found to precede the intermittent; the former being connected with recent injuries and acute inflammations, the latter taking its origin in chronic and subacute phlegmasiæ, and organic affections doubtfully classed among the phlegmasiæ, and supervening upon old ill-cured external wounds and injuries. The former is hence frequently denominated *inflammatory fever;* the latter is better known as *hectic fever*—the fever exquisitely of irritation.

With *Inflammatory symptomatic fever* we are familiar, as following within a short period wounds of the soft parts, fractures of bones, injuries of the head, violence done to a joint. Whether or no there is any pathological circumstance wanting, as some have been disposed to contend, which should induce us to withhold the title of fever from the disturbance of the system in instances of this kind, is not as
perhaps absolutely decided. We have here, however, beyond
ute, all the common phenomena which go to constitute the ordi-
definition of fever. skin, flushed and turgid face,
ed and red eye, anxious c ce, tongue red and coated with
ur, stomach uneasy and irrit at thirst, headache, languor,
cular debility and weariness occasional delirium, and a
frequent and tense and form a picture which cannot
to be at once recognized. e exclusive humoral system
applicable, and Stevens's v o the morbid condition of the
lating fluids seem out of What proof have we of any
ient change in the blood? ng of the kind is even pre-
ued. This is the history, too, as l of the febrile affections con-
ted with internal inflammatic ith external injury. It is a
cription not only of the conse es of a severe wound, but of
the state of the general system in urisy, rheumatism, and sore-throat. It may in both become of paramount consequence, and perhaps deserve to be regarded as even more important than the local affection. Yet its nature will be modified to a certain extent by the seat of the local excitement, and by the circumstances in which the subject is placed. In gastritis proper, for instance, and enteritis, we have a low and weak febrile condition, the pulse being small and feeble, and the nervous system prostrated; in phrenitis and rheumatism, on the other hand, the pulse is full and bounding, and the strength less impaired. In erysipelas we have either a synochal or typhous fever, to use the phrase of Cullen, according as the eruption occurs in a robust or invalid constitution, and in the country or in a crowded hospital. It would be altogether superfluous to discuss here the progress and treatment of this form of symptomatic fever. We shall have to speak separately of its numerous modifications, in detail, as we proceed through the long catalogue of maladies, of whose history it constitutes an essential part, whence the appellation, *pyrectic;* and we shall then lay down such rules for its control or management, as shall seem demanded in each particular instance.

HECTIC FEVER.

Some notice may, however, be taken here, without impropriety, in a general way, of *hectic*, or the *intermittent symptomatic fever*. It is not liable to be notably modified by any variety of circumstances, but preserves throughout every diversity of local connection, its specific peculiarities of character. Certain remedial measures are likewise supposed to be pretty uniformly appropriate, whenever it makes its appearance. There is, then, an advantage in stating once for all, in a condensed way, the prominent points in its history and character, the remedies most appropriate during its continuance, and the principles upon which their application must be directed. Time will hereafter be saved, too, and frequent interruptions avoided, by discussing the subject now, laying down with precision for future reference the rules which are to guide us.

Hectic fever, I have said, is in a peculiar manner the fever of irritation, and is prominently entitled to the appellation symptomatic. Yet there are weighty authorities from whom I have differed on this point. John Hunter recognizes an idiopathic form of hectic. Good quotes Dr. Percival as "subscribing," to use his own words, "to idiopathic hectic." Their reasonings and facts, however, are deficient in weight, and unless I grievously mistake, prove nothing more than their own inaccuracy or defect of observation. Dr. Percival, indeed, tells us that "he has known these idiopathic hectics to last three months, without any pulmonary affection, and then break out in the lungs." It would be necessary, to make his doctrine good, that these viscera should be proved to have been in a sound state throughout the first stages of the attack. With all proper deference for the authorities then which I have named, I must still affirm, that so far as I am aware, hectic fever never occurs spontaneously, being always preceded by and connected with an obvious cause—which cause consists in certain local disorder, usually of the inflammatory kind, and of some considerable previous duration. The local excitement from which hectic is derived, may be either external or internal; and among the seats of the latter, may be enumerated every viscus of the body. The bladder, the uterus, the intestines, the kidneys, the spleen, the liver and the lungs—the stomach and the mesentery, have all afforded and continue to offer indefinitely numerous examples. And here we should remark a very singular peculiarity in the case before us. All other fevers, typhus, plague, bilious remittent and yellow fever, which exhibit inordinate determination to and morbid alterations of structure and function in certain internal organs, as the brain, the liver, and the stomach, derive many or most of their characteristic phenomena from the nature and offices of the parts thus affected; hectic alone shows no change of type, but a perfect identity of history throughout, whether it be based on bronchial irritation, abscess in the loins, tubercular disorganization of the lungs or carcinomatous destruction of the uterus.

Among the internal causes of hectic, we may mention the whole class of chronic pulmonary diseases; it is thus a never failing attendant upon chronic bronchitis, upon pulmonary abscess, and upon tubercular phthisis, and it is in this unfortunate connection that we are most familiar with it. We meet with it in the suppurative inflammation of all the viscera of the thorax, abdomen, and pelvis—and in some chronic inflammations which do not terminate in suppuration, but in obstruction and induration; as in the tubercular enlargement of the mesenteric glands and of the pancreas.

I have not met with any instance, either in my observation or reading, of the supervention of hectic upon any form of disease affecting the brain or its membranes.

Of the external causes of hectic, white swellings, or scrofulous inflammation of joints, caries and necrosis of bones, compound fractures and compound dislocations, may stand at the head of a long list of similar modes of protracted irritation; for, as it has been already observed, time seems necessary for the production of that state of system in which this type of fever shall be built up.

So many of these sources of irritation are attended with the formation of pus, that the majority of the medical writers of the last age,
uck with the circumstance, ted in attributing hectic exclu-
sively to the absorption of t after it had been poured forth
nd about the diseased p a little attention will serve to
ince us of the erroneous this opinion, which is, indeed,
ost absolutely abandoned. eet occasionally with exquisite
stances of this form of fever, cannot even suspect the exist-
ce of pus, as in chronic rhe , and in gouty and scrofulous
llings of joints.

ese exciting causes would be fully adequate in themselves
ne generation of hectic fev ut the presence of any alleged
disposition; yet there is ur y a particular state of constitu-
n in which it is developed mo ily, and arises from slighter and
more transient irritations. This habit of body is closely analogous to the scrofulous, if indeed it be not, as some have supposed, identical with it. I am inclined to think, however, that it extends more widely, and comprises probably the whole class included in the characteristic description of the phlegmatic temperament.

Hectic fever I have denominated an intermittent. This arrangement I believe to be strictly correct, although some writers have repeatedly asserted that it is occasionally a true remittent, abating at intervals, without absolutely disappearing. This error, for as such I cannot but regard it, is founded upon an undue idea of the importance of the pulse in such cases, as a symptom. The debility and irritability of the constitution when hectic has supervened, have given rise to a continued rapidity of the circulation, which varies little from time to time—the pulse scarcely beating less than from one hundred to one hundred and twenty in a minute. Now, if the frequency of the pulse be a test of the febrile state, those are right who affirm that hectic does not entirely intermit. It is scarcely necessary, however, to remark upon the unsatisfactory nature of any such test.

Hectic fever, when developed fully, presents two paroxysms in the twenty-four hours. One of these has its access three or four hours before noon. The second comes on about twelve hours afterwards—six, eight, or nine at night. They are both somewhat irregular, as well in point of access as duration, although I have not found this irregularity so striking as it is described to be in the books. The paroxysm comes on generally with chilliness; sometimes, though seldom, there is a formed rigor. The skin is hot and dry, there is a burning heat at the soles of the feet and in the palms of the hands, the pulse is small, but hard and tense, jerking, quick, and, as has been said, very frequent—from one hundred and twenty to one hundred and sixty in the minute; there is a circumscribed spot of florid-red on each cheek, the more glowing as being contrasted with the surrounding paleness of the complexion, and the eyes sparkle with uncommon brilliancy. The thirst is considerable. The tongue is, for the most part, smooth and clean, but of a fiery redness, as are also the lips and the whole lining membrane of the mouth, upon which it not unfrequently happens that a light aphthous ulceration takes place. The stomach usually retains its tone, or at least exhibits none of the more familiar tokens of derangement, the appetite being pretty good, and the digestion apparently easy and perfect. Yet it is obvious that the function of nutrition is performed in a very deficient manner. There is in all cases of hectic, from whatever cause arising, great emaciation of the body and limbs; the very nails of the fingers become adunque or bent inwards; the teeth, and sclerotica of the eye are of a pearly lustrous whiteness, owing, as is supposed, to the total and entire absorption of all the fat and oily matters deposited in the cells of the adipose tissue, and in the interstices between the minute fibres of the bony and other parts. By this imperfect nutrition, too, the great muscular debility of the hectic patient is accounted for.

It has been often noted as a diagnostic or characteristic trait of hectic fever, that the spirits of the patient are usually undepressed. He retains all his cheerfulness and activity of mind, and is fond of dwelling upon the brightest pictures of days to come, which hope can present to his imagination. Such is indeed the fact, while, as has been above stated, the digestive system preserves unimpaired its condition of comfortable sensations and elastic tone—a state of things most frequently met with where the pulmonary organs have borne the weight of the attack. But should the febrile excitement have arisen from original disorder of any of the parts of the digestive system, or should the stomach become deranged during the progress of the case, under these circumstances a far different set of feelings will have possession of the patient; his tongue is furred, and pale, and soft, his appetite variable or deficient, and he will be languid and gloomy, hopeless and spiritless. Indeed, I regard this connection between the state of the chylopoietic viscera, and the mental condition of the patient, as so constant and regular, that I will venture to propose it as a diagnostic in all doubtful cases, and will declare that I never hesitate to consider the digestive system as disordered to an important degree, either primarily or sympathetically, wherever I meet with anxiety of mind, or disposition to gloom and melancholy. We can thus distinguish, in a majority of instances, what W. Philip calls *dyspeptic phthisis*, from true scrofulous consumption, and hepatic from pulmonary disease, in general. The emaciation which is common to all these cases of hectic, I would attribute in some to imperfect performance of the offices of the lungs, in others to disordered or defective action of the nutrient vessels of the capillary system.

The stages of hectic are not so regularly successive, nor as well defined as those of idiopathic intermittents. The day paroxysm seldom presents in any notable degree, the occurrence of a sweating stage, but at night the patient sweats freely. The night-sweats, which tend to weaken so excessively, patients in phthisis and other hectics, and which are often termed colliquative, I would regard merely as the solution of the night paroxysms. Whether this termination be promoted by the situation of the sick, covered up in bed, and perhaps asleep, and relaxed with weariness, cannot be positively pronounced, but it seems highly probable. Hectics who do not sweat at night, will complain of great heat and constriction of the skin, and of thirst and restlessness. In a very large proportion of the cases, there will be observed but one paroxysm of hectic in the twenty-four hours. It is a matter of uncertainty which of the two will be wanting. The order which I myself have most frequently noticed, is that, at first, there will be a morning paroxysm for a time, after which the patient will be weak and languid during the day, but free from fever until evening. As the case approaches its termination, the two exacerbations become more and more distinctly marked. Yet this course is not invariable, for in a patient whose case I had the best opportunities of watching closely, the disease at once developed itself in the manner described, with double diurnal paroxysm.

Treatment.—A few general remarks with regard to the treatment of hectic fever, may be offered in this place. The local source of primary irritation demands our principal attention. To the cure of this original disorder our remedies must be assiduously devoted, if we can discover its seat, and if the nature of the circumstances do not prohibit the hope of a cure. The knife must be employed to effect the removal of diseased parts which cannot be restored to healthy action, and which admit of being taken away. Where any obscurity hangs over the origin of the symptoms, the skill and discernment of the practitioner must be exerted to the utmost, to detect latent or internal causes of derangement which may and must exist, and to obviate or lessen their effects, or rescue the constitution from their influence. Upon these topics I cannot be expected to enter into detail. There are points, however, which will require to be attended to, and kept in view in such unfortunate cases as are met with but too often, when the primary cause of excitement neither allows of removal nor of cure. Hectic having been defined "the fever of irritation," it is reasonable to conclude that the very best remedies are such as are most aptly calculated to remove or diminish the morbid irritability of the system of the patient. For this purpose, opium has been much employed, and is without doubt exceedingly useful; but this excellent drug is properly to be regarded as a compound prescription, exhibiting a complication of effects, some of which are disagreeable, and it may be, even injurious to the sick. Its repeated administration in crude form, in some subjects, disorders the stomach, impairs the appetite, and occasions an increase of muscular debility and languor. Much has been gained by the chemical modes of preparation which extract the anodyne principle contained in the juice of the poppy, freed from the deleterious mixtures of narcotic, astringent, etc. The denarcotized laudanum is really an efficient and useful formula. Morphine and its salts offer us a great variety of prescriptions. I am compelled to say concerning all these, however, after fair and persevering experiment with them, that they do not deserve the implicit reliance which their eulogists place upon them. I have seen from each of them, in particular cases, all the disturbances, local and general, and quite in as distressing degree, which I have ever seen follow the use of crude opium. Yet it is the fact, that some one of these preparations may commonly be found, which will in each given case, answer all our purposes with little or no countervailing ill effects. A patient to whom I gave morphine, would enjoy from it a quiet and refreshing sleep; he had been accustomed to two febrile paroxysms in twenty-four hours; after taking it, he had usually but one, and sometimes was not attacked at all. The muriate of narcotine deserves a trial. It seems to possess decided powers, both as anti-irritant and anti-periodic; and, so far as I have seen, does not disturb the stomach or agitate the nervous system. With precisely similar views the spider's web has been prescribed, and has received high commendation for its alleged efficacy.

The prussic acid is much extolled as exhibiting a distinct control over increased or morbid irritability in general, and is of course regarded as specially applicable here. Among the names of those who report thus favorably of it, are Magendie, of France, Granville, in England, and Oliver and Anthony of our own country—no inferior authorities. I have been able to effect little or nothing, with this agent, to the advantage of my patient. In a case of phthisis, in which I was using it, the only influence which I noticed it to exert, was in putting a check upon the night-sweats, and substituting for them an intense degree of heat and dryness of skin, which the sick man declared to be intolerably tormenting.

Sulphur has been by some practitioners held in repute as a remedy generally, for diseases of paroxysmal type or periodical recurrence, and from analogy, I presume, with the ordinary intermittents, hectic fever has been supposed to offer an opportunity of procuring its remedial influences. It is prescribed in doses too small to excite catharsis or sweating. I have derived no assistance from it in hectic. Similar reasoning from analogy, has induced repeated experiments with cinchona; and although you will frequently be disappointed by this admirable remedy in cases of the kind now under consideration, yet you will find it occasionally of excellent benefit in restraining both the colliquative sweats and diarrhœa, and in restoring tone to the stomach and general system.

I prefer the sulphate of quinine in the majority of cases; in some, however, a combination of the infusion of bark with the sulphuric acid, will be found quite as tonic, while it possesses more decidedly astringent properties.

The mineral acids are indeed in common use, and are certainly not destitute of remedial influences in the latter stages of hectic, as agreeable astringent tonics.

The metallic salts are, many of them, greatly confided in. Arsenic been much used. I cannot take it upon me to recommend it. prepa[illegible]s of iron, the sulphate, iodide, acetated, and muriated tures, h[illegible] better claims to our notice.

Myrrh h[illegible]een regarded as endowed with some specific virtues, which adapt[illegible] to the treatment of hectic. A very favorite formula is [illegible]posed [illegible]rrh, sulph. ferri, and carb. potass.

[illegible]h [illegible]l exercise are, however, infinitely the best tonics here. [illegible] p[illegible] labors under great debility, it may be necessary to th[illegible]est modes of gestation, as sailing, and riding in a car- b[illegible] he can sit in the saddle, horseback exercise is preferable

use the phrase sym[illegible]er habitually, to denote condi- which are patho[illegible]inct from each other, and have d very little esse[illegible]. Thus, under the same term, nclude the cons[illegible]ent which *follows* a wound or nt; that which [illegible] the [illegible]asiae; and that which *precedes* eruption in the exanthemata.

We class many disorders as e[illegible]ally *pyrectic;* yet we have not n pains to designate or a[illegible] the relation which exists be- e local and the constit[illegible]isturbance. The word "symp- ' applied to the fever, which [illegible]s always present, indicates "a e conclusion," which is not d[illegible]wn from any careful examina- n the premises.

CARDIAC AFFECTIONS.

The great central organ of the circulation is liable to suffer from a large variety of diseases, whose importance and gravity can hardly be overrated, although I think their frequency is exaggerated. If we reflect a moment upon the prompt and numerous sympathies which connect it with every part of the body; upon the almost universal share which it bears of the burden of diseases promiscuously; upon the readiness with which it responds to every feeling, emotion, and passion of the mind—fluttering with terror, throbbing with anxiety, bursting with grief; and upon its incessant and unresting action, we shall wonder that it is so seldom disordered, in a serious and permanent manner; so seldom altered materially in structure.

I am aware that it is customary among pathological writers to treat of cardiac diseases as of very common occurrence; I am persuaded, however, that except the symptomatic and transient disturbances with which the profession has always been familiar, they are comparatively rare, at least in our own country and its southern portion. To prove this it is only necessary to refer to what is said by the best European authorities, concerning the connection of the several forms of carditis with rheumatism. "The number of patients," says Watson, "that come into the hospitals of London, affected with acute rheumatism, is annually very large; and I do not think that I am exaggerating when I say that *nearly one-half* of them have the heart or its membranes implicated." Bouillaud goes farther, and makes the same statement as to a still greater proportion, more than half, or 64 in 114. Latham accords with him. McLeod brings it down to one-fifth. After forty years' practice, I can truly assert that I have seen very few attacks of rheumatism terminate in serious, palpable disease of the heart among my patients. I am happy to confirm this favorable view from the popular work of Professor Wood, whose practice has been very extensive. "The proportion," he says, "to the whole number of cases is exceedingly small. Every physician of age and experience is surrounded by persons in perfect health, who have recovered from rheumatism, under his care, at various periods. I should be at a loss to point out more than a single case of incurable heart-disease which has resulted from inflammatory rheumatism, under my own care, in persons above the age of maturity."

Cardiac affections show themselves generally by varied and well-marked manifestations; by pain in the left thorax, at the seat of the disturbed organ; by morbid impulse and morbid sounds; by dyspnœa, palpitation, and syncope; by discoloration of lips and countenance; and by œdematous swellings. They are connected as cause and effect with anemia, inflammation, hypertrophy, valvular obstructions, ossification, sabulous and calcareous deposit, apoplexy and hæmoptœ.

We should make ourselves familiar with the position and space occupied by the heart; with its average force of impulse; and with the ordinary sounds resulting from its actions at different points of the chest. We shall thus prepare ourselves to appreciate properly the physical signs which denote its enlargement, its violent or defective efforts, the mechanical impairment of its function occasioned by organic changes, and the substitution of new and morbid in the place of the natural sounds. The hand, the ear, and the stethoscope, should be employed in the examination. The latter enables us to locate and circumscribe the different sounds from which we derive inferences as to the condition of the organ and its several parts.

The action of the heart is liable, we should always recollect, to be disturbed by many transient contingencies; and both the pathognomonic symptoms and physical signs which then present themselves, very often resemble very closely those which attend upon change of structure. The uncertainty thus resulting is confessed most readily by the most sagacious and skilful practitioners, and should make us especially cautious in both our diagnosis and prognosis. I have, in the course of my long experience, seen several young persons restored to perfect health, who had been reduced to despair by the unfavorable opinion given them by expert stethoscopists, concerning the condition of the heart. I had occasion, formerly, to allude to a recent post-mortem examination at which I was present, of the body of a very distinguished person, who had received a positive written statement declaring him to labor under cardiac disease of grave organic character, after careful exploration and consultation. No such disease was found; the heart was natural and healthy. In treating of the pulse, I spoke of its intermission, connected always with intermittent cardiac action, as a most capricious and inexplicable phenomenon. I know many persons whom it alarms greatly, by its occasional occurrence, who yet enjoy long intervals of entire freedom from it. It is by this absolute interval that we shall generally be able to distinguish functional or neurotic, from inflammatory and other structural disorder of the organ. The latter, when definitely pronounced, or of any important extent, may remit, but never passes off entirely; the ordinary demands of muscular action and respiration reproducing constantly the disturbance of action, as in walking up stairs, attempting to move hurriedly, or raise a weight.

The natural sounds of the heart are two: the first is referrèd to the muscular contraction of the dense, strong, muscular substance of the ventricles, the spreading of the mitral and tricuspid valves, the motion of the current of blood and the impulse of the heart against the thorax; the second, to the movement and tension of the semi-lunar valves of the great arteries and the strong pressure of the current of regurgitating blood against them; if, as Cruveilhier believes, the diastole of the ventricles is "abrupt, active, rapid, energetic"—he describes it as "triumphing forcibly over pressure, and opening with violence the hand closed upon it"—this surely ought to be taken into account.

We should attend to the rhythm of these sounds, which, in health, is regular and exact. "From the commencement of the first sound to its return, a little less than a second of time is occupied. Of this, one-half is occupied by the first sound, the next quarter by the second, and the last quarter by a period of rest" and silence.

Of the impulse of the heart, a person in sound health should be unconscious. If he is forced to feel it, and attend to it, there is something wrong. It may increase until it jars his body visibly, and may even distinctly shake the bed on which he lies. This is usually the result of hypertrophy or enlargement; but may occur independently of it.

The morbid sounds, which are denoted significantly, as resembling the noises made by air passing through the nozzle of a *bellows*, by a *file*, or a *rasp*, or a *saw* in use, depend upon a certain degree of resistance to the current of blood passing through the outlets into the vessels. This is usually occasioned by an abnormal condition of the valves. But it is proved that certain states of the blood may produce it, as in chlorosis and anemia; oil or mucilage might flow smoothly and noiselessly along a channel in which water would suffer a ripple and give a murmur. We must admit that these sounds are sometimes heard, when we are not able clearly to account for them.

I proceed to treat of cardiac affections in the following order:—1. Inflammation; 2. Valvular alterations, Hypertrophy, and Dilatation; and 3. The Neurotic derangement of the organ.

INFLAMMATION OF THE HEART may attack its substance, carditis; its investing membrane, pericarditis; and its inner lining membrane, whose folds chiefly compose the several valvular structures, or, at least, constitute them in great part.

CARDITIS proper is, perhaps, of rarest occurrence. Its existence is inferred when we have the general, pathognomonic, constitutional signs of inflammation of the organ, and fail to detect those which are considered characteristic of the other special localities. I have seen, I think, one well marked case of it.

There is great pain and soreness of the part, with acute fever; palpitation, and, indeed, constant irregularity of action attends; there is much dyspnœa; the patient is apt to faint upon motion. The physical signs, as I have said, are not marked.

Autopsy.—Copeland gives a case "in which there was no morbid sound on auscultation though the above symptoms were present. The substance of the heart was inflamed; the pericardium presented hardly any marks of inflammation; portions of the internal surface were slightly affected." Stanley found "the whole muscular tissue of an intensely dark red, or almost black color, much softened and easily separable, and the ventricular walls infiltrated with a bloody pus." Others have seen small abscesses among the muscular substance; infiltration of pus; ulceration sometimes with perforation either of the outer membrane fatal at once by effusion, or of the septum, permitting the mixture of venous with arterial blood. Softening of the heart is ascribed to this source, the parts assuming a yellowish, whitish, or reddish brown hue; hence, perhaps, certain instances of rupture of the heart; gangrene also is mentioned.

Chronic carditis has been supposed to give rise to hypertrophy, to induration, and to cartilaginous and osseous transformations.

All these changes may occur, however, unconnected with any notable symptoms of cardiac inflammation. Hypertrophy, as we shall see, is usually the consequence of obstruction or insufficiency of the valves; Atrophy or softening depends upon some cachectic or other defect of nutrition; osseous, earthy, and cartilaginous depositions, exhibit no relevance whatever to this alleged cause; fatty and granular degenerations arise, we know not how, obscurely and inexplicably. All these modes of degeneracy may determine softening and rupture. I have seen but a single instance of this accident. The patient, a female of middle age, died suddenly, upon turning in bed, after a few days' illness, during which nothing had drawn any special attention to the heart as the seat of disease. On opening the thorax, the organ within the pericardium seemed to be of immense size. The sac was thus distended with coagulated blood and bloody serum, an indefinite amount of which gushed out when an opening was made, the coagula being not less than about a pound. The blood had escaped through an opening in the right auricle; the valves of both sides were sound. The heart was loaded with fat, and the muscular tissue of the right side especially, had undergone fatty degeneration or substitution. The auricle was very large, and in the neighborhood of the opening there was dark infiltration into the tissues, and particularly over the inner surface. Nothing exhibited a trace of previous inflammation. The stomach was intensely inflamed, small, and much contracted; its inner mucous membrane highly corrugated, and its vessels injected deeply and of a very dark color.

The *causes* of carditis are exposure to cold, mental emotion, metastasis or extension of gout and rheumatism, extreme fatigue. Copeland speaks of cases resulting from the vehement and protracted exertion of pumping a leaky ship, and it has been noticed in bodies dead of plague and of smallpox.

PERICARDITIS, the inflammation of the lining membrane of the heart is not often met with alone. I have seen it associated with rheumatism, and quite as frequently with pleurisy and pleuro-pneumonia. The symptoms are pain in the cardiac region—sometimes extremely severe, sometimes dull or almost wanting—increased usually by pressure, or turning from side to side, palpitation, anxiety, oppression, dyspnœa, occasional swooning, lividity or œdema of the face. There is much fever, often commencing with c lse small, frequent, wiry, irregular; cough is apt to attend. physical signs are dulness at first from turgescence; the fric nd, as of two rough surfaces rubbing together, owing either to ss or to shreds of membrane on the inner face of the sac, then creaking, or the *cri de cuir;* effusion of serum soon dulls all s and does away the friction sound.

The *anatomical lesions* consist frequent coating of the heart and its serous investment with fa mbrane or coagulable lymph. This is sometimes in shreds, som in a continuous layer of varying thickness, sometimes in diffus ches. The cavity is filled with serous effusion, in quantity varyin n ounces to pounds; the books contain an instance in which there were six pints of it. It is yellowish, sometimes sanguineous, sometimes sero-purulent. Rarely, the two surfaces have been found adherent, constricting the heart. The substance of the heart may escape change, or it may be more or less altered as in carditis proper.

The *causes of pericarditis* are those of rheumatism and pleurisy with which it is so often associated. It may happen as the extension, also, or metastasis of gout. Cold will sometimes give rise to it if abruptly applied. It is said to follow the retrocession of erysipelas and other eruptive affections. Prof. Wood has "seen it result apparently from the cure of psoriasis by local applications." It prevails more in young persons than in old or middle aged; in men than in women.

The *diagnosis* is not always easy or clear. It may be confounded with hydrothorax or with pleuro-pneumonia; nay, Copeland tells us that he mistook it for gastritis, there being present pain at the epigastrium with vomiting and hiccup, probably from diaphragmatic pleuritis. The disturbance of the circulation—palpitation, and swooning, if attended either with the friction sound or great dulness and impairment of the impulse and sounds of cardiac action, will prevent our making any mistake.

ENDOCARDITIS.—Inflammation of the internal lining membrane of the heart is usually unattended with acute pain; there is dull oppression, great anxiety, and much disturbance of the circulation; dyspnœa and orthopnœa aggravated by bodily motion and mental emotion; the pulse is small, and weak, and frequent, while the heart is struggling vehemently. After a while, the valves become thickened, or clogged with membranous deposit or with coagula, the face becomes pale and livid, with faintness, restlessness, and threatened suffocation; the mind wanders, there is drowsiness sometimes and stupor, and œdema spreads extensively.

The *physical* signs are at first not striking: the impulse of the heart is undue and the sounds dull on account of the turgescence of the loaded cavities. We soon perceive the bellows murmur from partial obstruction or imperfect closure of the valvular orifices. "This murmur is sometimes soft, sometimes rough or harsh, and sometimes musical."

Anatomical Lesions.—There is deep redness of the membrane, perhaps from imbibition of blood, with frequent thickening, roughening, and inequality. Bouillaud tells us that concrete fibrinous matter may generally be found, either adhering in small pieces to the valves or the membrane near them. These he supposes to be the origin of the excrescences or vegetations so often observed in the same position. The valves are liable to be found puckered and adherent by their edges to one another, or to the heart's surface. If the case be protracted, these lesions of the valves are inevitable and become prominent.

The *causes* of endocarditis are those of pericarditis and of carditis proper. The *diagnosis* is to be made by a careful exploration and consideration of physical signs collated with the common associations of rheumatism, pleuro-pneumonia, or gout; and the absence of the special symptoms of hydrothorax and the other maladies with which it is possible to confound the case.

The *prognosis* of acute cardiac inflammation is said to be on the whole generally favorable. The duration of the attack is very nearly of septenary period. The special prognosis is drawn from the continuance or yielding of the symptoms of general disorder and the subsidence or exaggeration of the physical signs.

The *treatment* of these inflammatory affections of the great central organ of the circulation, whether seated in its substance or its investing membranes, must be prompt and efficient. The mere protraction of the attack is so great an evil and menaces such serious and terrible consequences as to justify or call for the application of our most heroic remedies. The lancet must be at once employed and venesection carried to the extreme of constitutional tolerance. Antimonials must next be exhibited in such free doses as to produce nausea and sweating; the best authorities advise to combine calomel in large enough quantities to purge without delay, and afterwards to bring on ptyalism. This is alleged not only to arrest the inflammatory action, but directly to impoverish or defibrinate the blood, which is generally buffy, and thus to prevent depositions of lymph or false membrane. I am disposed strongly to recommend the veratrum viride. A few drops of Dr. Norwood's strong tincture would act without loss of time, and very decidedly as a sedative, controlling, as it always does, both the force and frequency of the heart's action, and nauseating the patient with some purgative effect.

The first violence of the invasion being by such means subdued, we may resort to digitalis in proper doses, or, as adapted to the combination with gout and rheumatism, colchicum with alkalies and opium. The valerianates of zinc and quinine have been highly extolled in examples of protracted irritation of the great central organ. I have seen epispastics on the side and on the arms of seeming benefit. Full doses of Dover's powder should be administered at bedtime.

The diet should be carefully regulated, moderately nourishing and unstimulating; and the most perfect quiet of mind and body enjoined.

STRUCTURAL DISORDERS OF THE HEART.

Chronic *valvular disease* of the heart is, I think, exclusively the result of the last mentioned form of inflammation of this organ, endocarditis. In some instances the skilful management of the convalescent and the caution with which he is guarded against exposure to any excitement or annoyance mask the continuance of the physical signs of local disease. In others, it is probable that an obscure and gradually increasing affection, originally of chronic character, arising from the same causes which produce the acute form, though in less intensity, or in an obtuse subject, may have gradually built up the same local lesions.

The general or constitutional symptoms thus arising are dyspnœa when any occasional muscular action is required beyond the average; the patient goes slowly, panting, up stairs; walks languidly; he lies with his head high, and feels and attends to the beating of his heart, which is sometimes irregular, throbbing, palpitating, intermittent; his pulse is weak, his face pale and his eyelids œdematous; his feet swell at evening. Great debility supervenes, with hypertrophy of heart; hæmoptœ, lividness of lips and complexion, failure of appetite and universal prostration. The anatomical changes in the condition of the *valves* vary much. They are, as said above, puckered and adherent to one another, or to the surface of the heart; they are sometimes simply thickened; they are sometimes studded with excrescences "of all sizes from a minute granule to the bulk of a pea or a bean," usually arranged along their edges, soft and hard; they sometimes present deposits steatomatous, calcareous, osseous; they are sometimes ulcerated; sometimes atrophied; sometimes seemingly contracted. The effect in these different instances is that sometimes they present a positive obstruction to the outward current of blood, and that on the other hand they prove insufficient to prevent the returning or regurgitating flow when the systole ceases and the heart undergoes diastole or dilates.

The *diagnosis* of these valvular affections must be made by a careful exploration and full collation of all the physical signs. We shall be aided in our inquiry by attention to a few preliminary remarks, the result of the wide experience of expert practitioners.

Forget lays down some propositions worthy our confidence. He says:—

1. Of all the signs, abnormal sounds are the most expressive; yet we should be aware that they are less precisely significant than is pretended.

2. Contraction and insufficiency of the cardiac orifices are less positive causes of abnormal sounds, than is generally taken for granted.

3. Alterations in the valvular tissue are the most positive causes of the bellows sounds.

4. An obstacle presenting itself in the great circulatory tube, it will dilate behind the obstacle; next it will contract before the obstacle; and thirdly, the muscular parts behind the obstacle will tend to take on hypertrophy.

5. Organic alterations of the valves are almost always in the left heart; and are rarely met with in the right heart.

6. Lesions of the mitral orifice are as frequent as those of the aortic; lesions of both at once as frequent as of either separately.

From the valuable paper of Prof. Flint, in the *Buffalo Journal*, May, 1852, I add the following brief, clear, and, as far as my experience reaches, accurate statements:—

1. "Valvular lesions are uniformly accompanied with more or less bellows sound." This accords with Forget's 3d proposition.

2. "In a vast majority they are seated in the left side of the heart; they are mitral or aortic." Hope gives the proportion as 20 to 1.

3. "The mitral sound is most intense over the body of the heart, between the fifth and sixth ribs." Bowditch says, in his useful and compendious *Young Stethoscopist*, "between the third and fourth ribs, and two inches from the sternum."

4. "The aortic sound is most intense at the intercostal space between the second and third ribs near the sternum."

5. "The *pitch* of the mitral bellows murmur is lower than that of the aortic."

The persistence of the bellows sound, if combined with the other and more general signs of cardiac disease may be considered then as pretty clearly proving the existence of valvular alteration. If there be no hypertrophy, the change is probably in the mitral valve; if there be enlargement, the aortic valves are probably obstructed or insufficient, or both the aortic and mitral. These inferences are drawn with more confidence if the sound be increased in roughness, and enhanced into the filing or rasping noise, or the double motion sound like a saw. I have not met with, and do not pretend to diagnose an alteration of the tricuspid or pulmonary artery valves, as occurring separately.

The *prognosis* in valvular disease is unfavorable. The tendency to dilatation of the heart and hypertrophy is almost irresistible; the hope of relief or removal of the cause of the symptoms almost null. All that can reasonably be expected is to retard the progress of the disease, and to protract life by great prudence and caution.

The *treatment* is therefore entirely palliative and protective. I have no confidence in any measures having for their object the restoration of the valvular structure to its original symmetry and normal exactness of adaptation. The principal indication is to prevent, as far as possible, any undue excitement of the action of the heart; to avoid all demands upon the respiratory and circulatory functions beyond what is merely necessary. In a subject whose sanguification is rapid and active, it may be occasionally proper to take away a little blood. The diet should be unstimulating though nutritious; little animal food should be allowed if any. Milk, butter and eggs should, perhaps, be the only exceptions. Digitalis may be employed from time to time as a sedative. Perhaps the veratrum viride, if found manageable and well borne by the patient's stomach, will supersede the necessity of any other article of the kind. The bowels must be kept soluble with the saline laxatives. Exercise in the open air is indispensable; but walking is injurious and dangerous; the patient must ride in a carriage or on a quiet horse, or take sailing excursions. The mind must be kept in a state of as perfect repose as possible, free from care, anger, or other passion, and anxiety.

HYPERTROPHY OF THE HEART.—Increase of the bulk of the central organ of circulation is the direct effect of any interference with its action continued for any length of time. Its struggles against restraint tend either to thicken its walls or distend its cavities, or both; and these conditions so generally concur, that hypertrophy and dilatation are almost of necessity treated together.

Yet, though hypertrophy is most often the result of obstruction to the passage of blood out of the heart by contraction of its orifices, or by the regurgitation of the current admitted by insufficiency of the valves, the organ is so impressible, so ready to respond by violent action to mental emotion of any kind, or to physical effort when vehement or protracted, that we find it, not rarely, unconnected with valvular change. Hope speaks of the influence of pedestrian tours among the Swiss and Scotch mountains in producing it, through the effect of violent muscular exercise. Rokitanski says it may originate in excessive innervation of the heart.

Indeed, it has been plausibly ascribed to everything which may diminish the power of the organ, relatively to the amount of blood it is required to propel. Fatty degeneration has been adduced as an example; there is no reason why softening, or any other mode of impairment of its muscular contractile energy, may not induce the same consequences of hypertrophy and dilatation.

"There is," says Gairdner, "much capriciousness in the relations of cause and effect here. The most dilated heart I ever saw, was one in which very slight rigidity and possibly slight incompetency of the mitral and aortic valves existed without contraction of either. The heart lay quite across the thorax, and could not have been less than 10 or 12 inches in length, with corresponding increase of breadth. The cavities were enormous." He also mentions a heart in which "the ventricles being normal, and the mitral valve alone slightly rigid, the auricles had undergone a dilatation quite enormous. The left was capable of containing a moderate sized cocoa nut; the right would have held a billiard ball. The walls of both were slightly hypertrophied. As a counterpart to these I have often seen great valvular disease, with little hypertrophy, and dilatation. In the case of mitral contraction, I have even seen the heart small, and the relation of its cavities all but normal."

There is great indefiniteness in the estimates made of the average or normal size of the heart, and of the average or normal thickness of its muscular walls. Laennec says that it is in any individual about the size of the closed fist; this is perhaps as accurate as any estimate yet offered. It varies with age and sex, and I suppose also with habits of muscular exertion or labor. The average weight of the male heart has been calculated at about 9 ounces, of the female 8, by Clendinning. Lobstein says the heart weighs between 9 and 10 ounces; Cruveilhier sets it at from 7 to 8 ounces; Meckel as high as about 10 ounces. Reid says, "in an athletic male, we would expect it to weigh about 10 ounces, in an ordinary sized person about 8, and in weakly persons still less." Nor is there less difference as to the length, which Meckel rates on the average at 5½ inches, and Bouillaud at 3¾ inches. Hence we must not be too hasty in pronouncing upon the bulk of the heart in any equivocal case as indicating a morbid condition.

Hypertrophy presents itself with or without dilatation; is *centric* or *eccentric.* It may consist in mere thickening of the muscular walls of the organ without either contraction or dilatation; or with contraction of the cavities; or with dilatation of the cavities; or we may have the walls distended and thinned with more or less increase of capacity of the ventricles and the auricles.

The first must be rare. Of the second, concentric hypertrophy with contraction, we have a curious case recorded by Laennec, "in which the parietes of the left ventricle had acquired the thickness of from an inch to an inch and a half, and the cavity seemed capable at most of containing an almond stripped of its shell. Yet the day before the patient's death his pulse was natural, his breathing free, and nothing," continues Laennec, "led me to suppose that this man had disease of his heart." Both Cruveilhier and Reid doubt whether such firm contracted hearts are morbid; agreeing with Budd, that "the diminished cavity is merely the result of the tonic contraction of the muscular wall of the ventricle in death." Dr. Da Costa, whose special and intelligent attention to this subject has made him a most competent authority, has seen, he tells me, an unequivocal case of concentric hypertrophy, in which the thickening of the walls and almost entire obliteration of the cavity could not be explained by any possible muscular contraction before or at the time of death. Of the increase of size in the ordinary form of hypertrophy with dilatation, I have already given very striking instances from Gairdner. I will add two or three from Reid (*Cyc. Anat. & Phys.*). "In one case of general hypertrophy, the weight of the heart was 22 ounces. The circumference was increased to 12 inches, the longitudinal diameter five, and the transverse 8 inches. In a patient who died at the Hôtel Dieu in 1834, the heart measured 15½ inches at its base. Of certain recorded cases, the right ventricle in one was large enough to contain a goose egg; and the left, still larger, the closed hand of a female. In another, a child of 7 years, the right auricle was so dilated as to contain a coagulum as large as the closed hand of an adult." Of dilatation an extreme example is given by Bouillaud, in which "the right cavities were so dilated, and their walls so attenuated, that the auricle was converted into a kind of transparent membrane, and the ventricle reduced to the ordinary thickness of the auricle."

Diagnosis.—The augmented space occupied by the enlarged and dilated heart, is traceable by percussion, while the impulse is strong, often much stronger than natural. The sound, usually loud, if not otherwise abnormal, becomes dull and grows duller when the muscular walls are thinned in marked degree. Hydrops pericardii would give the same wide space of dulness, but impulse and sound are lessened. The same is true of pleural effusion, oppressing the heart, and if not displacing it, yet interposing between the explorer and the organ.

Causes.—The additional causes besides those already suggested, are excesses and debauchery, pulmonary disease, "hepatic and renal affections, with atheroma and aneurism of the great arterial trunks, especially the aorta." Anemia and chlorosis are also mentioned here. In some instances no cause can be assigned. "Nothing can be more puzzling," says Gairdner, "than cases of hypertrophy and dilatation without valvular disease, without any appreciable mechanical cause, and often without the concomitant of diseased or degenerated muscular fibre."

Prognosis.—The frequency of cases in which the above statement of the absence of mechanical causes is applicable, gives reason for a hopeful view of the subject. Where a transient series of contingencies [illegible] this most impressible of all organs by nervous [illegible] by care, or grief, or anxiety, a certain [illegible] may take place which shall cease to go forwards [illegible] are removed. Dyspepsia, by bringing on [illegible] and frequent palpitation; pneumonia and [illegible] impeding the pulmonary circulation, [illegible] admitting of control or removal, may [illegible] dilatation and hypertrophy. I am [illegible] several instances in which, after much [illegible] restored; in one such, I think, perfectly. [illegible] examples of recovery where the physical signs [illegible] marked and persistent.

[illegible] be directed upon principles already indicated. [illegible] detected and is removable, it must be taken away. [illegible] health of body and mind, must be carefully looked [illegible] of the disturbed organ must be controlled by se- [illegible] much in use and is often serviceable. The vera- [illegible] of avail. Prussic acid has been of benefit. [illegible] advantage from the valerianates of zinc and iron. In- [illegible] preparations of iron have been exhibited and extolled

[illegible] at intervals; the frequent use of laxatives, and [illegible] adapted to particular cases, in which some remains of [illegible] may be present; but I cannot think them gene- [illegible] I prefer to sustain the patient's strength with nourishing but unstimulating diet; to give him abundant fresh air and passive exercise by gestation, while I endeavor to regulate by the means above mentioned the force and frequency of the pulse. The mind must be kept as quiet as possible. In women, hysterical excitement may be checked by the use of camphor, castor, assafœtida, ether, and chloroform, and the tendency to palpitation carefully watched. Minute doses of morphine or some of the numerous preparations of opium are of great value; indeed they have seemed to me indispensable in the management of a great majority of the cases. Yet opium must be used with prudence and reserve. If pressed too far, the ultimate tendency becomes injurious.

NEUROPATHIC DISORDERS OF THE HEART.

The heart is peculiarly liable to functional disturbance and derangement; indeed, it may be affirmed, that few escape some degree of suffering from these causes, at some point in their history; usually when adolescence is approaching maturity, and life with all its passions and anxieties opens in prospect.

They excite great alarm, as they closely simulate the grave organic diseases which we have been discussing; it is therefore highly important that we should study them carefully, and distinguish them clearly.

PALPITATION.—This term has been already employed to denote the vehement and irregular pulsations which attend upon cardiac diseases. It is far from being confined to these, however; it is met with in hundreds of cases of transient character; produced by mental emotion of every variety and name; a frequent symptom of dyspepsia; one of the ordinary results of impoverishment of blood from whatever cause, hemorrhage, anemia, chlorosis, inanition; one of the thousand annoyances of the nervous irritable temperament, the hysteric, the hypochondriac.

It needs no description. The inordinate action of the heart may be seen as well as felt; nay, is so violent sometimes as to agitate the patient, and even shake the bed on which he lies. It is usually irregular, and connected with intermission of pulse, but not uniformly.

The *diagnosis* must be made by careful exploration and patient attention. For the most part the physical signs of cardiac disease will be absent; but in the anemic we will, frequently, hear the bellows murmur. In these cases, however, there will always be periods of relief and intermission; there will have been no antecedent causative disease, as rheumatism or pleuro-pneumonia; and tonics and exercise will be better borne.

The *causes* are numerous; many have been already alluded to. Besides those, we may specify the use of tobacco; the effect of previous wasting disease, or of medicines given for its relief, such as digitalis; of large bleedings; secret vices and sexual excesses.

The *prognosis* may be declared to be favorable as a general rule;

ord re adily enough subsides, in the great mass of cases, on ov avoidance of its causes.

will depend upon the apparent circumstances upon n s built up. If connected with, or symptomatic of other ite malady, this must be got rid of or relieved. If the result of or impoverishment of blood, the preparations of iron will te our best remedies. When belonging to the history of nervous disorder, the immediate effects may be palliated by ident use of narcotics and cordials; the valerianates of zinc, d quinine, have done good service in my hands; opium, with r, as in the common elixir paregoric, will often give prompt ief; musk, castor, and assafœtida, are much used; prussic acid is a lmant and tranquillizer; and I should not hesitate in a paroxysm any severity to employ chlor oth in moderate inhalation as partial anæsthetic, and intern a soothing cordial. I have n blisters to the thorax issue or seton in the arm, of benefit; perhaps by dir attention of the patient from readed malady to the ann nedy.

e diet should be nourish rather stimulating; exercise ld be taken constantly in the air; amusement and recreation ded duly, by change of pla elling, and agreeable employ- t; and the cold bath or sea g resorted to if within reach, antly or patiently endured, ted to the season of the year.

SYNCOPE.—Leipothymia, well defi ed by Cullen, "motus cordis minutus, vel aliquamdiu quiescens.' This languor or temporary suspension of the function of the heart, is the prominent point in its description or history.

Fainting comes on—sometimes, but rarely, without premonition—usually with an oppressive feeling of weakness and sinking, rapidly increasing to unconsciousness. The visage is pale or livid, the pulse is feeble or ceases to beat, the skin becomes cold, the eyes are turned upwards and half closed, the respiration is scarcely to be perceived, or there is gasping and moaning; the patient falls insensible. This state is of uncertain duration, sometimes continuing long enough to simulate actual death, at others only for a few minutes; at last the circulation is gradually restored, the breathing becomes more distinct, warmth and color return to the surface, and the consciousness and muscular strength come back. Recovery is apt to be attended with vertigo, sometimes with nausea, and even vomiting. There is much tendency to relapse on rising. I have twice seen violent convulsions—quasi epileptic—in patients not subject at all to epilepsy, attend restoration from syncope.

Diagnosis.—From apoplexy it is distinguished by the paleness and coldness of the skin and face; the quickness, frequency, and feebleness of the pulse, if it can be felt; and the subdued respiration. Asphyxia from the breathing of irrespirable gases, will be known by the history and attendant circumstances. In hysteric insensibility and loss of motion, the pulse still beats regularly, and the color remains.

The *prognosis* is almost uniformly favorable; a few fatal cases are, however, recorded. I am inclined to think that we should place here some of the deaths ascribed to what has been called "simple apoplexy," that is, apoplexy without any traces of cerebral lesion. Still further, deaths attributed to *coup de soleil*, insolation, are often, I believe, the results of absolute exhaustion, overwhelming syncope; and even those cases described by Russell and Dowler as "pulmonary, not cerebral apoplexy," may be of syncopic character, the congestion in the thoracic vessels taking place because of the sudden cessation of the heart's action, while the lungs were filled with blood from exercise and fatigue; the right ventricle—ultimum moriens—contracting last.

Causes.—Among the predisposing we may rank general debility from previous disease or suffering; and constitutional mobility of fibre both accidental and hereditarily transmitted. Fainting is frequent in particular families; women are much more liable to it than men, yet two of the most susceptible subjects I have known were sturdy young men; children are seldom seized with it, yet I have seen several attacks of great violence and long duration in a child when about seven weeks old.

The occasional causes may be arranged under three separate heads. The first comprises such disorders of the heart itself, as shall disturb and interrupt, mechanically or otherwise, the regularity of the action of the organ. 2d. Such contingencies as shall depress the circulatory power, directly or indirectly; hemorrhage; inanition from want or from protracted disease; inordinate discharges, whether natural or morbid; the removal of the abdominal distension in dropsy, by allowing the blood to rush into vessels from which it had long been expelled by pressure of the distending fluid; pregnancy occasions fainting fits by the undue determination of blood to the uterus, leaving the vessels of the heart and brain unsupplied. Harvey, the discoverer of the circulation, notices the fact that "fainting is apt to occur even in robust subjects at the moment of removing the fillet, as the vulgar say, 'from the turning of the blood.' I have been induced to think," he continues, "that this cold blood rising upward to the heart is the cause of the fainting." Richardson supposes it to be owing "to the heart's being overwhelmed by the additional amount of blood thrown into it while weakened. The same effect," he says, "is seen in transfusion, if the blood be injected in or forced on too quickly." The hemostasis induced in the instructive experiments of Buckley, brought on a condition approaching to fainting, but it does not appear that syncope followed in any instance the removal of the tourniquets applied to the limbs.

Under the third head I include such agents as make their primary impression on the sensorial system; pain of great intensity or of peculiar character; exquisite pleasure; sudden relief from pain; disagreeable impressions, not positively painful, as the effect of heat and bad air in crowded places, of unpleasant odors, or from idiosyncrasy, odors not unpleasant; the sight of disgusting objects; mental emotions, both gentle and violent, as pity, sympathy, impatience, joy, grief, terror. It is amusing to be told (as we are in *Dickens' Household Words*, No. 2) that horses not unfrequently faint when first lowered into the deep coal-mines, where they are employed in great numbers. "The attack seems to be produced by the combined influence of fear, and motion in descent, and profound darkness. They are recovered by fanning, too, as women are."

How this last class of causes act in occasioning syncope is difficult to point out with clearness. None of them are directly sedative in their operation. Cullen ingeniously attributes their effect to a rapid and complete exhaustion of the nervous energy; but this cannot be true of them all. An active energetic lady of my acquaintance cannot witness, without fainting, the very trifling operation of vaccination. Marshall Hall tells us of fine ladies who faint from impatience in attempting to untie a knot in a silk thread.

The *treatment* must be modified by the condition of the patient and the cause of the attack. The patient must be placed in a recumbent position with the head low. Dash cold water in the face, apply pungent volatiles to the nostrils, and if the case be threatening and protracted, touch the eye with ammonia, or the extremities with a heated iron, or slap the whole surface sharply. Apply warmth and irritants to the surface, and have recourse to galvanism or electricity if at hand. Prevent him from rising too soon when recovering, and administer some warm nutritive fluid with wine.

To prevent recurrences of syncope, the causes must be inquired into and removed, or their influences palliated or corrected; the general health must be improved by a generous diet and proper regimen. Exercise in the open air must be enjoined, and the system invigorated by tonics, stimulants, and sea-bathing, or the shower-bath, unless contraindicated.

ANGINA PECTORIS. "*Hyperæsthesia of the cardiac plexus*," *of Romberg.*—The nature of this painful and distressing affection is obscure, and in the uncertainty which has prevailed concerning its intimate character and proximate cause, each writer who has treated of it has employed a name or denomination referring significantly to his own particular views of the subject. Thus, it is called by some, *syncope anginosa*, to express its supposed analogy, in certain points, with common syncope or leipothymia; and thus, Darwin, dwelling emphatically on the dyspnœa which forms so prominent a symptom, has styled it "*asthma dolorificum*." Good has conferred upon it the title of "*sternalgia*, or breast-pang," a term as free from objection as any other, on the ground of its being inexpressive of and unconnected with any hypothetical notions concerning its pathology, and intended merely to bring forcibly to the attention the most annoying and uniform circumstance in its history—the pain at or under the sternum. I have, for a similar reason, adhered to the original name applied to the disease, which alludes simply to its locality and painful character.

Angina pectoris is very seldom met with before the middle term of life. It is of the paroxysmal or recurrent form—is not, however, governed by any definite periodicity in its intervals—after the few first attacks, is disposed to become fixed in the constitution with the tenacity of a habit, invading with apparent independence of the causes which at first seemed necessary to give rise to it.

The earlier attacks are sudden, and entirely without premonition; they come on when the patient is engaged in some considerable muscular effort, under circumstances which may embarrass his respiration, as in ascending a steep acclivity, or a stair, or walking against the wind; after the paroxysms have been repeated, they are brought on by very slight exertions, and at last invade spontaneously even when he is at rest. At first, they are of short duration, ceasing when the muscular action which produced them is suspended, as by standing still, turning from the wind, or sitting down; when it has become spontaneous or chronic, they may last an hour, or even more.

The patient is seized with pain of extreme severity, shooting across the upper or middle part of the sternum, and extending down the arms half-way between the shoulders and elbow; the left arm is commonly thus affected, but sometimes the right, and occasionally both; in succeeding paroxysms, this pain extends to the wrist, and even to the very fingers. There attends, at the same time, a dreadful sense of suffocation, with oppression and constriction of the chest, and an overpowering fear of instant death. The countenance is pale, the breathing suspended, or hurried and irregular. The pulse differs very much, there being, as I shall point out, two separate and well defined classes of cases; in one of which, it is full and hard, varying in point of frequency, sometimes hurried, and at others slow or intermittent, and occasionally altogether undisturbed.

In subjects affected by the chronic form, and in a few instances from the very first, it is apt to be contracted and oppressed, faltering and feeble. Inattention to this striking discrepancy in the state of the circulation, has given rise to exclusive and erroneous views in practice.

I have said that after a few repetitions, the paroxysms are brought on by the slightest muscular exertions, as by coughing, loud talking, vomiting, straining at stool, until finally they invade spontaneously without any obvious cause; it is said, that they are much more likely to recur when the stomach is distended by a full meal.

The general *prognosis* is unfavorable. A majority perhaps survive, the disease assuming an habitual character, and allowing time for the application of our remedies, which, if employed with assiduity, perseverance, and fortitude, may be ultimately successful in its complete removal, and, at any rate, promise very notable alleviation of suffering. But, in a very large proportion of the subjects, sudden death is occasioned by the violence of one of the early paroxysms.

The *pathology* of angina pectoris is uncertain. Post-mortem examinations have hitherto failed to throw any strong light upon the proximate cause or morbid condition upon which it depends; let me say rather, that they have revealed to us so many and such varied changes of structure in bodies dead of it, that we are quite at a loss to distinguish between essential and incidental lesions, and unable to decide whether the derangements discovered, are not rather the coincident effects, than the sources of the diseased actions which constitute this strange malady. Thus, the coronary arteries of the heart have [illegible] found ossified—as have the valves—hypertrophy, both concen[illegible] and eccentric, etc. etc., but none of these alterations are constant or unvarying.

My own [illegible]ion of the nature of angina pectoris is, that it is a functional [illegible]ion of the heart itself, neither dependent upon a disordered sta[illegible] [illegible]f the stomach, nor on a gouty diathesis, as Butler, [illegible]cQueen, a[illegible] Chapman have taught, nor upon simple vascular [illegible]hora, as [illegible]intained by Hosack, although each of these contin[illegible]ies mus[illegible] acknowledged to be among its efficient predisposing [illegible] occasional causes.

[illegible]r do I admit of its being necessarily connected with any organic [illegible]ge in the structure of the heart or of its vessels, an opinion ably [illegible]cated by Parry among others, though, as I have stated, it is found [illegible], in certain subjects, [illegible] the presence of such changes. [illegible]omberg affirm[illegible] [illegible]steria are its chief predisposing causes," and denies [illegible] [illegible]ralgia is necessarily associated [illegible] organic affections of the [illegible] [illegible]ennec declares that "in a light [illegible] moderate degree it is a very [illegible] and transient malady."

[illegible]s view of the pathology of [illegible]a, is founded upon the occur[illegible]e of cases in which, upon d[illegible], no morbid alteration of any [illegible]n or part could be discover[illegible] [illegible]l other muscles are subject to [illegible]p or spasm, and there can [illegible] reason alleged, why the heart [illegible]ld be exempt from this gene[illegible]ility, and all my patients have [illegible]ted to the cardiac region as th[illegible]cipal seat of suffering, making [illegible] of the word spasm, as the best [illegible]ted, by analogy, to convey an idea of the nature of the agony the[illegible]lured. That the diaphragm is also thrown into a sympathetic state or spasmodic contraction, seems highly probable, from the history and symptoms of the attack.

Treatment of Angina Pectoris.—This requires, obviously, to be divided into, 1st, a discussion of the means of relief demanded during the paroxysm, and 2d, a recital of the plans proposed as adapted to ward off an attack, and remove the liability to a recurrence of the disease.

During the *paroxysm*, if the pulse be full and hard, we must resort immediately to venesection, which should be large and effective. It is rare, indeed, that the lancet is not called for in the early paroxysms, and while the patient retains any degree of strength and vigor. Dr. Hosack's opinion of the connection of angina with a general plethora of the system, has been already alluded to. Whether the concurrence be fortuitous, I will not pronounce, but it has happened, that with few exceptions, the cases which I have met with, have been in persons whose figure, corpulence, and habits of life, have strongly predisposed them to apoplexy and paralysis. One such exception was seen in the first case which came under my notice. This was also the youngest patient I have known. He was a soldier, pale, or rather livid in complexion, very feeble and thin, with a weak, faltering pulse. He died soon after I first saw him.

In one patient, to whom I have been repeatedly called, an attack of apoplexy supervened while he was struggling in an accustomed paroxysm of angina, which had come on when he was rising from bed in the morning. I arrived promptly, and instituted a course of most energetic depletion. He recovered with hemiplegia, the paralysis not prohibiting his making an imperfect use of both his upper and lower limbs; and, so far as I know, has had no recurrence of angina since that time.

But a considerable proportion of instances occur under a set of circumstances directly contrasted and opposite. Misled by his own observations, which would seem to have been limited to this class of cases, Marshall Hall has incorrectly enumerated among the diagnostics of angina pectoris, "a pulse feeble, faltering, and irregular." Here we must, of course, modify our practice in relation to the condition of the patient. It is in these subjects that sudden death is to be dreaded; and the impending catastrophe can be averted only by the most decided and hasty impression on the system by the highest order of diffusible stimuli; ether, brandy, camphorated spirits, the volatile alkali; either of which may be administered in large dose, the most convenient being, for that reason, preferable.

No time should be lost in aiding their effect, by the application of the most powerful and ready counter-irritants to the surface of the thorax, and to the extremities. Cloths, wrung out of hot water, hot spirits, or hot turpentine, should be laid to the chest and to the wrist and ankles, while we persevere with the internal administration of the most active stimulants, hot toddy, with or without laudanum, in free doses, brandy in which pepper and spices have been infused, etc.

I would suggest the prompt inhalation of chloroform as a means of relief to the painful spasms of these terrible paroxysms. I have not had an opportunity of witnessing the trial, but a case in which the experiment was made at my desire, is reported to have been instantly relieved, and very decidedly benefited by it. Many patients, it is said, find relief from raising their arms, and keeping them elevated.

An emetic has been recommended by Good. I have never seen an attack in which there was time or opportunity for its administration. It might be useful to empty the stomach of an undigested meal, or of any other crude and irritating contents.

Purgatives are also spoken of, but I must avow that I cannot understand their utility in a moment of such urgent need. I would administer an irritating enema, if it could be done without delay. The affusion of cold water is proposed by Frank, and others. If proper discrimination be made in its employment, I should expect some advantage from it. I should consider it adapted to the same plethoric subjects who require the lancet, but I would restrict it to the head and face.

The treatment in the *interval* is of no less importance, and demands our particular attention. It becomes our duty to examine closely into the apparent and probable causes which give rise to the disease. In those unhappy cases in which it is connected with, or sympathetic of, organic derangements of the heart, we can only hope to effect some alleviation of suffering. We must enjoin quietude, restrict the patient to low diet, and inculcate the avoidance of all excitants, whether moral or physical. Something may be done by the use of digitalis, and other narcotics, employed in such dose and manner as to curb the irregular action of the disturbed organ, and by the occasional relief of moderate bloodletting. I should be very much disposed to make a fair trial, under these circumstances, of the prussic acid, in some of its concentrated preparations, and in cautious but efficient amount.

Where the digestive function is deranged, we must direct our efforts to restore that system to its proper tone and correct action. Alterative doses of mercury may be serviceable, especially if combined with gentle and regular purgatives. Such tonics as seem best adapted should be perseveringly employed. The salts of iron, bark, and the bitters, with aromatics, have been used with good effect.

In a gouty patient, for this combination has been much dwelt on, we must strike at the arthritic predisposition. In such cases, the tinct. of guaiac. has proved exceedingly serviceable, especially if it keep up a steady action upon the bowels. Here, also, colchicum promises to be useful. When dependent upon, or, as I would prefer to phrase it, associated with, a plethoric fulness of the vascular system, we must place our chief reliance upon the observance of the strictest regularity, temperance, and habits of exercise. Indeed, under all the various undefined modifications of cause and of constitution, the best general treatment of chronic disease, and the most successful, is that which regulates most exactly the regimen and conduct of the patient.

The dilatation of the heart, and the softness and flaccidity of its muscular fasciculi in some autopsies, have given rise to the conjecture that, in these instances, at least, the disease consisted in a weakness—a loss of contractility in the cardiac fibres, which rendered them incapable of propelling the blood with force sufficient, especially under the additional demands of muscular action. Any measures, then, which will tend to diminish the mass of blood without subtracting from the strength or tonicity of the muscular fibre, must evidently be serviceable to the patient.

It may seem inconsistent that I should recommend exercise as a remedy after enumerating it among the principal exciting causes of the paroxysm. It is easy to ascertain what modes and degrees of exertion are injurious, however, and these should be carefully avoided. There are very few instances, indeed, in which passive motion—the several exercises of gestation—are not well borne, and, indeed, highly beneficial. Sailing, and riding in a carriage, are the easiest of these. Some bear the saddle well, and to such horseback exercise is most useful. A severe case is related by Marshall Hall, in which the patient could easily sustain the shaking on horseback, although he suffered an immediate attack of pain even on the mere attempt to raise himself in his stirrups.

Among the most efficient of our remedies, we must arrange the several modes of permanent counter-irritation, issues and setons, and perpetual blisters. These may be placed on the chest, the arms, the thighs, the wrists, and ankles. They may be made by moxibustion, by the use of nitric acid, or in any other of the usual modes. I prefer the irritation of repeated blisters, putting them alternately upon the thorax, near the heart, and upon the upper part of the arms, on the inner side adjacent to the insertion of the deltoid. To do any good, these plans of counter-irritation must be persisted in for a length of time. It has been suggested that, during their employment, we may find it beneficial to suspend them for a short interval occasionally, resorting, in the meanwhile, to topical depletion by leeches, or cupping the back of the neck or the thorax; and it seems to me to be likely to do service, if there be no objection to the loss of blood in this mode.

Having no confidence in the efficacy of what are called specific remedies for angina, I have laid no stress on them. I may mention here, that cures are reported to have occurred under the exhibition—with this view—of Fowler's arsenical solution, of the sulphate of zinc, of the carbonate and sulphate of iron, of the nitrate of silver, and of belladonna.

I had rather, in conclusion, dwell upon the importance of a persevering inquiry into the causes which have produced, and which tend to render permanent, this distressing malady, that we may be led to institute such measures as are adapted to their removal, or the diminution of their evil influence, thus pursuing a rational methodus medendi.

HEMORRHAGE.

A spontaneous flow of blood is a frequent, if not an essential, symptom of many diseases or forms of disease. It occurs also independently of other affections, constituting a serious and occasionally a fatal malady, and requires, in either point of view, our close attention. I have preferred to discuss it under the present head, because of the pathological uniformity of the conditions presented in the various localities which it affects. It is always referable directly to a morbid state of the vascular system, either in general, or in the part in which it takes place.

What may be the first link in the chain of diseased movements which shall eventuate in hemorrhage, is, however, far from being distinctly known. The flow of blood is an effect; we know not, at least in an infinite majority of instances, the primary cause. One intermediate condition is, as I have said, uniform; but it is not exclusively characteristic; *hyperæmia*, the inordinate determination of blood and its disproportioned afflux into the vessels whence it is to issue, exists also in inflammation. It is in both instances alike, the consequence of either irritation or congestion; but what determines or develops inflammation, on the one hand, and hemorrhage on the other, is yet to be discovered. Nor is the mode of escape, the manner of outlet found by the vital fluid, uniform in cases of hemorrhage. At times, we have actual rupture, solution of continuity either by laceration or erosion; but this mode, which in former times was considered general or universal, is now known to be the rarest form of hemorrhage.

2d. Again, we meet with hemorrhage from surfaces entirely unbroken, absolutely sound, exhibiting on the most careful examination, either no change at all, or if any, a mere injection of the vessels or a thickening or softening of substance, similar to what are seen in ordinary inflammations.

3d. Again we have, as in scurvy and purpura, and at the termination of some of the malignant fevers, a notable change in the crasis or condition of the blood itself, which seems thin and dissolved, and ready to ooze through all the vessels that contain it.

In the second of these classes are included most of the hemorrhages properly so called, and to these—though we must not neglect the first and last varieties—our reasonings on the subject will be found specially to apply.

Effusion of blood in any large quantity, is a very alarming disease, or symptom of disease, but, in general, is less fatal than terrifying. Syncope is apt to ensue promptly in proportion to the suddenness of the occurrence, both because of the moral and physical influences exerted. Fear may quickly diminish the force of the heart's action; and the fainting state, which every loss of blood has in itself a tendency to produce, gives opportunity for the formation of a clot or coagulum, in the opened vessel or upon the bleeding surface, which may restrain the tendency to its recurrence in slight cases, and such as are dependent upon transient agencies. Hence the propriety of permitting the patient to remain awhile in this fainting state, and the injudiciousness of the efforts so often made to rouse him hastily by stimulants in serious hemorrhage.

Hemorrhages have been divided into the active and passive; and this distinction may be retained, premising an explanation of the terms, which refer, as it will be shown, to the general condition of the patient, rather than to any local circumstances connected with the effusion of blood. Cullen, after Hoffman, regards hemorrhage as an affection essentially pyrectic, and has indeed arranged it as an order (iv.) under his first class Pyrexiæ. Others consider this pyrectic character as belonging only to the active hemorrhages, and admit the existence of a class which they denominate passive, as being free from combination with fever. To avoid any confusion in this matter, Good has substituted the terms entonic and atonic, which I think ought to be preferred, as expressing more distinctly the reference to a general or constitutional condition of the subject. The first, or entonic hemorrhage, takes place when the system of the patient is at the ordinary condition of strength, tone, or vigor; the second, or atonic hemorrhage, when it is below this point, and in an enfeebled state of general health.

I need not say that I neither admit the correctness of Cullen's view of the nature of this disease, nor of the distinction first quoted. I have frequently seen active, entonic hemorrhage, occurring in full and robust patients unattended by any febrile appearances; and on the other hand, have often had melancholy occasion to witness passive, atonic hemorrhage, in the latter stages of fevers, both idiopathic and symptomatic, as in yellow fever and hectic.

The occurrence of fever, when it comes on consentaneously with hemorrhage, seems to me, at least in an infinite majority of cases, merely accidental, taking place only as a coincident effect of the same cause which has determined the flow of blood.

Even in the pyrectic hemorrhages, it is indeed wanting, for the most part, at this earlier period, and supervenes afterward in the passive, as well as in the active forms, from that degree of irritation which is the almost inevitable consequence of so great disturbance as is thus created in the functions, and of the increase of mobility and irritability of the nervous system, which ensues in the weak and exhausted state of the patient.

I have said that hyperæmia is a condition of the vascular system, or some part of it, invariably connected with or antecedent to the occurrence of hemorrhage. I deny the existence of a general or universal hyperæmia, and would merely suggest in this place, that even if we acknowledge a general hyperæmia as the cause of hemorrhage, we must give some reason why the effusion should be determined to escape from the particular organ or tissue affected.

This afflux must constitute a local hyperæmia, in every instance, a disproportioned, or undue determination of blood to the parts; disproportioned not to any supposed absolute amount, but to the capacity of the vessels forming the tissue or organ. By the supposition of a general hyperæmia, we account for none of the phenomena. The essential point in the case under discussion, is the disproportion on which I have dwelt. No matter how moderate or how deficient the absolute amount of circulating fluid, no matter how reduced the subject may be, if this quantity and the force with which it is moved be too great for the strength of the vessels. A majority of the instances of hemorrhage that have come under my care, has been among men and women of thin and spare, if not emaciated habit; and Sir Gilbert Blane, in his investigations of the statistics of apoplexy, so often a hemorrhage in the brain, found the greater number of attacks to take place among the poor.

This tendency is not unaptly spoken of as a *hemorrhagic diathesis* by Lange, who discusses it in detail, and gives tabulated results from 140 examples, "met with in the northern hemisphere, in Europe and America, chiefly in Germany." The sea coasts present more instances than inlands; plains than mountains; vine countries are very liable to it. Its subjects are apt to be short lived. Of the spontaneous outbreaks in different parts, epistaxis is most frequent and fatal; only one of the (fatal) cases arose from hæmoptysis, the diseased condition seeming to have no affinity with tuberculosis. Accidental causes, such as scratches, cuts, leech-bites, tooth-drawing, give great trouble, healing slowly; yet gangrene rarely occurs. Fordyce says that superficial bleed more than deep wounds, but Lange does not confirm it. In one case, vaccination, though successful, gave rise to profuse bleeding. This diathesis sometimes shows itself in the first weeks of life. I once saw an obstinate and fatal bleeding from the umbilicus, which I ascribed to this condition in the little subject. Lange says that such hemorrhages as arise from this tendency are more frequent in spring and autumn. The blood is thin and deficient in coagulability. The intellect of the subject is usually good, the complexion fair, the hair light, the eyes blue; the muscular system often strong and well developed. With the exception of this last characteristic, his description will apply to the only instance in which I have had under my own observation a family of "bleeders" as they are often called. The three dren to whom I allude here were fair, feeble, pale and thin. They d languidly and died early; the eldest attained with great care and most attentive nursing his eighth year. Rokitanski regards the disease as consisting in a delicate construction and vulnerability of the vessels and a watery condition of the blood.

In certain cases, the radial artery has been observed to be transrent in some spots, owing to deficiency of the fibrous coat. We ve not paid sufficient attention to this condition.

elt, in his *History of Ipswich*, states: "There are four families in
town called 'bleeders.' Three of them are immediately and one
r mediately related. They are thus named from an unusual propensity in their arteries and veins to bleed profusely, even from slight
wounds. A cut or other hurt upon them assumes at first the common
arance, but after a week or it begins, and continues for
ral days, to send forth almost eady stream of blood, until it
ecomes nearly as colorless as wate "None but males are bleeders,
hose immediate children are not s d whose daughters only have
s thus disposed. The proportio these who may thus resemble
r grandfathers is uncertain. Th are not submit to V.S. They
bleed largely at the nose. the families brought this pe-
ity with them from Engla Dr. Hay, of Reading, gives a
history; and Dr. De Ross f Wilmington, met with the
culiarity in a negro family.

w of nothing which distinct forms us of the existence of a
oric or hemorrhagic state of system previous to the first
currence of actual effusion somewhe , and on subsequent occasions
the return of such symptoms as may have immediately preceded the flow of blood, and hence give reason to dread its repetition. These symptoms will, of course, come more particularly under our consideration, when we go on to speak of hemorrhages under their separate heads; we may now remark generally, that they consist in certain sensations of weight, heat, throbbing, fulness, tension, or pain, at or near the points from which blood is about to issue.

These, it will be at once perceived, are the very phenomena which concur in the description of inflammation, and the recital might seem to give ground for the inference that the pathological conditions of the two are identical; they are, however, referable to the simple and ultimate fact of the existence of an undoubted hyperæmia in both cases.

All these unpleasant sensations thus alluded to, as they depend upon the presence of an undue amount of blood in the vessels of the part affected, a congestion either active or passive, are at once, and for the most part, entirely relieved, when a sanguineous discharge takes place, whether it finds an outlet by rupture of a vessel, or, as in general, by exhalation, to use Bichat's phrase, by exosmose, exudation, or diapedesis. Hence arose, plausibly enough, the ancient opinion that hemorrhage was the result of an effort of the *vis medicatrix naturæ*, that it was a salutary and remedial process, efficient in the prevention of some threatened evil, or in the cure of some present malady. It followed that many losses of blood came to be considered critical, and one of the nicest applications of our art was deemed to be the imitation of this natural remedy, and its precise application in point of time. Nay, as it was difficult to distinguish between those hemorrhages which are truly critical and salutary, and those which were morbid and hurtful, there arose in the minds of physicians a dread of interference generally, and a disposition to let such cases alone, as dangerous to tamper with.

These views are entirely fallacious, and calculated to lead us, on the one hand, into an erroneous mode of practice, or, on the other, to a fatal dependence upon the powers of nature. I will not deny that relief from certain troublesome symptoms is afforded by certain hemorrhages; I will acknowledge that when they take place from the vessels of unimportant parts, they are occasionally of advantage, and deserve to be looked on as less evils than those of which they are the substitutes; nay more, they are sometimes, on the principles of revulsion, very usefully remedial; as, for example, when cerebral disorder is relieved by epistaxis or hemorrhoids. But it does not follow from all this, that hemorrhage is to be neglected or regarded with indifference. It is in itself, under all circumstances, inconvenient and annoying. It gives but a transient relief, even when best adapted to the removal of previous disease. By its continuance or repetition, it establishes a perpetual determination to the surface, or organ, from which it issues. It unfits such tissue for the performance of its physiological functions. I need not enlarge upon the direct injury it occasions in deteriorating the quality of the vital fluid, and impairing its nutritive and stimulating properties. Sanguification becomes more and more imperfect, the proportion of fibrin and red globules lessening, and the serum and watery parts increasing. The tone of the living and acting fibre is deteriorated, the sensorial system thrown into extreme disorder, the whole organism deranged in its movements, and hurt in its capacity for action, and either atrophy or fatal dropsy supervenes.

In our treatment of hemorrhage, it will be found necessary to view it as one link in a chain of morbid circumstances—by no means, except in some rare instances, to be considered alone, or as an insulated fact. Like other morbid affections, it will disappear if its cause be removed, and it behooves us carefully to investigate its causes. I have already confessed that these are often obscure and ill understood. In the examination of the surfaces which have yielded fatal hemorrhages, as in hæmoptysis and intestinal bleedings, it has been remarked by numerous authorities, from Morgagni down, that nothing can be detected to explain or account for their occurrence. The mucous membrane is often unimpaired; it is sometimes paler than usual, sometimes redder, sometimes a little softer to the touch, or a little thicker. In epistaxis, no change has ever been noticed, so far as I am aware. In scurvy and purpura, the gums become spongy and dark colored, but often bleed freely without erosion. In the hemorrhagic stage of malignant fever, there is no lesion of the surface of the mouth, tongue, etc. The membrane usually assumes an intense red hue, but I have an hundred times satisfied myself of its entire integrity. This is easily done by wiping off the blood as it oozes; a magnifying glass will show many minute points from which the fluid escapes; but the flow will often intermit, the appearance remaining unchanged.

Autopsies now and then reveal erosions and lacerations which have produced hemorrhage. The former occur more frequently in the mucous membranes, as of the lungs and bowels, the latter in the brain; their comparative infrequency, as sources of hemorrhage, is, however, well known.

In the discussion of the general management of the disease, which is, of course, all that is proper under the present head, we must pay special attention, in the first place, to the avoidance of its exciting causes; and, in the second, make every effort to remove the predisposition on which these causes may act.

The occasional causes which give rise to hemorrhage, are numerous. They will be found to comprise all the circumstances which shall, on the one hand, increase the force of the circulation, and, on the other, determine specially this force or afflux to particular parts. As examples of the first, we may mention all violent muscular exertions, such as running, lifting weights, leaping; passion, or mental emotions, vehemently aroused; all stimulants. Of the second, exposure to cold and sudden alterations of temperature; diminution of atmospheric pressure, as at great heights; external violence; inflammation of any organ or tissue; improper postures; the use of ligatures unduly applied, so as to retard venous circulation; exclusive or disproportioned employment of certain organs, as among goldsmiths, musicians, etc.

Writers make a distinction between arterial and venous hemorrhages. In early life the former are said to be most frequent, in more advanced age the latter; and the explanation of this difference is ingeniously derived by Cullen, from the fact ascertained in the experiments of Sir Clifton Wintringham, that the proportional density "of the coats of the veins, to that of the coats of the arteries, is greater in young than in old animals."

Each of the individual hemorrhages seems to be specially incident to a given period of life; thus in childhood and youth we have epistaxis; at the time of puberty and in early manhood hæmoptysis; after maturity, intestinal bleedings, hemorrhoids, menorrhagia, apoplexy. Particular constitutions exhibit a continued tendency to hemorrhage; thus children who have been notably liable to epistaxis, are also apt to become the future subjects of hæmoptysis. There are also hereditary predispositions to all the forms of hemorrhage, and these predispositions, whether they depend upon the obvious malformation of parts, or on the succession of more obscure morbid peculiarities, are so powerful in their tendency, that to escape or evade their efficiency requires the nicest attention, the greatest skill, and the most unwearied diligence.

In this connection I must not omit to speak of what are called vicarious hemorrhages. These form a class of very curious and interesting phenomena; they are usually met with where any one of the natural secretions or excretions is wanting, whether from obstruction or defective action in the organ supplying it, and supposed to be a sort of substituted outlet for such discharge. They occur almost exclusively in females, and attend upon cases of obstinate amenorrhœa, or, as it is affirmed, of dysmenorrhœa. They take place most frequently from the lungs, stomach, and nostril. Dr. Finley relates an impressive instance of hemorrhage from the mammæ; and stories are found in the books of its issuing from the finger, the foot, or any point, indeed, of the internal and external surfaces. In a case under my own care, of extremely defective and difficult menstruation in a young lady, there was repeatedly a slight discharge of blood, preceded by a vesicular eruption, from which it issued, upon that portion of the skin of the cheek, directly below the eye, which in so many females assumes a somewhat darkened hue during the monthly period.

No very striking peculiarity of management seems to be required in these cases. While we resort to the means best adapted to obviate the pressing evils which may arise in the impairment of the functions of organs thus vicariously affected, we must not neglect to apply the proper remedies for restoring the natural and regular secretions or discharges.

The most important circumstance in the history of hemorrhage is its tendency to recurrence. This recurrence may be either irregular, or, as is well known, periodical. It is easy to understand how the rupture of any bloodvessel shall occasion a comparative weakness of that vessel. It is also clear, that vessels which have once yielded to distension, whether by active or passive congestion, and have been relieved by exhalation, no matter what meaning we may attach to that term, shall yield more readily on a repetition of the afflux and distension. Blood may either escape from the orifices which gave vent to the natural secretion (such as the mucus from mucous membranes), distended by forcible determination, and debilitated by local disease, or loss of contractility; or it may transude through the parietes of the vessels, under influences not easily intelligible, but dependent on an impairment of its own vitality, or of the vital tenacity of the vascular tissues. If the first attack depended on a permanent condition, such as any malformation, any peculiarity of minute structure, any hereditary taint, or upon circumstances that are repeated or continue to exist, such as perseverance in the same occupation, amusement, or mode of life, it is evident that a second will be more readily brought on, and thus a morbid habit be firmly established.

The periodicity of hemorrhages is a fact as obvious and undoubted as that of other diseases, and no less difficult to account for. While the majority of medical writers confess their ignorance of this matter, and content themselves with a reference to the universal disposition exhibited in the animal movements to a periodical revolution, there are others who boldly ascribe the phenomenon to lunar influence, and maintain the direct correspondence of the returns of hemorrhage with certain phases of the moon. Among these the principal are Mead and Mosely, the latter of whom has related more than one case strongly confirmatory of the doctrine.

The general remedies for hemorrhage may be arranged into two classes. The first consists in mere abstraction, by which we diminish the force of the circulation, and lessen the impulse of the fluids in motion. Rest in a recumbent posture, silence, darkness, absolute diet, cold, venesection, purgatives, and other evacuants, and the whole catalogue of supposed sedatives, nauseants, and narcotics—these are the most influential, and may all be employed in turn, or combined so as to act promptly upon the system. It is obvious that they are applicable specially, if not exclusively, to the entonic hemorrhages. The second series of remedies comprise such as are revulsive in their operation, creating new determinations, and changing as promptly and thoroughly as may be the points of afflux. Local irritants, such as mustard, blisters, and the like, active stimulants of particular surfaces, as salt, emetics, and some purgatives to the digestive mucous membrane, are obvious examples. Less direct, but still very effective in the same way, is venesection, both general and topical, and the sudden impression of cold applied to the skin.

The next, and a very important indication to be attended to, is the removal of the predisposing cause—the defective state of the constitution already described. How shall we treat this tenacious condition? plethora, or whatever else it may be called; how prevent the hemorrhages of which it is the fruitful parent? I answer, not by venesection, nor by low diet, though these, with the other means of abstraction and revulsion, have been already recited as often available for giving immediate relief, and obviating impending and pressing evils. Let us aim rather at restoring the tone of the relaxed solids, than at the mere diminution of the mass of the animal fluids. Let us employ our best efforts to renew the lost physical energies of our patient. For this purpose, we must control, judiciously, his whole course of conduct, and direct all his modes of life. If a manufacturer, an imprisoned appendage of the counting-house, a "pale artisan," invite him into the open fields—let him hold the plough, or handle the flail. Send forth the toil-worn student, or the idle sensualist, on distant voyages or long journeys, and let them travel on foot or on horseback. It is my conscientious belief that nothing less than this total change of all the habits of living, will be of any notable or permanent advantage to those afflicted with the very obstinate morbid condition which we are now discussing.

This prophylactic treatment of the hemorrhagic patient, however, must be conducted with care and nicety, and will require much modification in the various instances which present themselves. Thus, though, as I have above stated in strong terms, the great principle to be kept in view is the re-establishment of the proper tone of the system, by earnest and persevering exercise, yet we will meet with cases in which this chief remedy is altogether inadmissible, or must be resorted to with extreme delicacy. All motion acts as an excitant to the circulation, increasing its rapidity and force, and the immediate evil thus occasioned is often so prominent as to prevent all the good effects which might have been anticipated for the future.

It was in the contemplation of such cases as these, in which exercise must be forbidden, that Sydenham made the so often quoted declaration, "He who discovers a substitute for exercise on horseback, will find what is infinitely more valuable than the philosopher's stone;" and to such cases I would apply the remark of Cadogan, in recommending a milk diet to gouty patients, who would sometimes reply that their stomachs could not bear it, "the very instances in which the remedy cannot be borne, are those in which it is most needed."

As early, then, as the patient can endure to be removed without injury, let him be carried forth into the open air, if the temperature of the season admit. If not, place him in a rocking-chair, or in a chamber-swing. Walking is a mode of muscular exertion too exciting at first, but there are many modes of useful gestation, as in a carriage, or boat; set him as soon as possible in the saddle, still protecting him from all dangerous atmospheric changes.

Those unfortunate subjects in whom the tendency to periodical hemorrhage has become a habit, require special attention. When the flow of blood is expected, keep the patient at rest, on low diet, and in the utmost tranquillity, moral and physical. The lancet and the proper revulsives may be employed as circumstances indicate. A thorough change of condition in life should be recommended; a long journey, a sea voyage, another place of abode, a different occupation, should be tried, while a strict and watchful avoidance of all occasional exciting causes is most impressively enjoined.

But the application of our remedial means is best discussed in detail under the separate heads into which the particular hemorrhages are divided; and to the consideration of these, in a brief way, I next proceed.

EPISTAXIS.—Hemorrhage from the nostrils is a disease of very frequent occurrence, both in connection with other maladies and in an insulated way. It is little feared in general; nay, it has come to be regarded very often as salutary in a high degree. In many fevers, and in the headaches which attack the young and robust, the loss of a small quantity of blood from the nose is usually coincident with a subsidence of the violent cerebral suffering, and is supposed to be productive of great relief. Of all the hemorrhages, it has attained the highest confidence as of critical benefit in such cases. It is, perhaps, also the most frequent of them, as assuming a vicarious character—being often substituted for natural or habitual discharges when suppressed. There are no popular prejudices which have spread more widely than these, even among our profession, and none have taken deeper root. It would seem in vain to contend against them, but I will venture at least to express my dissent, and to state my own views of the subject. In regard to fevers, I have observed that this, like all the other hemorrhagic discharges which belong to the history of fever, is not likely to occur in the early stages, when, if ever, they would be desirable and salutary, but come on after the violence of vascular excitement has in some measure subsided; they follow rather than precede, and therefore can not logically be regarded as causing the diminution of pains in the internal parts—a remark which is especially applicable to headaches. If we notice the several stages of fever carefully, we shall meet with epistaxis at the end of an exacerbation; at the commencement of a remission. It depends upon, and does not give rise to the occurring changes. It is not always even a token of favorable change; but, as far as my own experience goes, as frequently precedes and betokens unfavorable change in the state of a patient. In ordinary headaches, it does not bring about the relief with which it is occasionally coincident; for it is the result of a counter-irritation—an altered determination of the fluids, not the cause of this irritation and determination. The pain in the head is owing to a centripetal determination of the blood, by which the cerebral vessels are enlarged and distended. Epistaxis ensues when a centrifugal determination is in any manner set up, and the vessels of the Schneiderian membrane become the seat of engorgement and congestion. We do not know the nature of this change—we cannot imitate, or effect it artificially. Cephalic snuffs have been invented, of very varied quality, intended to irritate the membrane, and bring on bleeding from the nose; and stimulant odors and volatiles are perpetually resorted to with the same view—how ineffectually, let the sufferers from constitutional headaches be called upon to testify. When we bleed topically from the same surface, as by leeches, the failure of the effort to relieve the cerebral vessels is no less notable, and, indeed, is proved by the more general reliance placed on the abstraction of full quantities of blood from the arm, or the revulsive measures of cupping about the neck, shoulders, and epigastrium, and bleeding in the foot.

Treatment.—There is, for the most part, no difficulty in restraining the accidental epistaxis of childhood or early youth. The application of cold to the head and face is usually sufficient. A variety of other modes of producing similar impressions are resorted to; a large key is thrust down the back—the feet are put into cold water—the patient is directed to sit in a tub of cold water. The general cold bath is used either by affusion, the most efficient method, or by immersion. These transient remedies, however, do little more than procure a sort of truce with the disease; to prevent its recurrence, when a repetition, after brief interval, has shown the existence of such a tendency, we must endeavor to remove the causes, and do away the state of constitution on which it is engrafted.

Entonic epistaxis is accompanied or preceded by giddiness, or pain in the head, flushing of the face, and other marks of undue cerebral determination, with a pulse somewhat full, tense, and frequent. This state of things requires an immediate resort to active antiphlogistic measures. Blood should be taken from the arm if the intensity of the symptoms demand it. In general, however, a saline cathartic will reduce sufficiently the excitement present, and confinement, for a few days, to a vegetable diet, with rest and abstinence from mental and physical exertion, will establish a tranquil condition of the system. We should inquire into the habits, amusements, and occupations of the patient. The games of childhood demand regulation. The heat of the sun must be avoided, and the ardor of too vehement exercise restrained; we must forbid the performance of dangerous feats of agility, as summersets, etc., and the assumption of improper postures, those especially which keep the head hanging, or the neck bent backwards.

In the more advanced periods of life, epistaxis becomes now and then a very serious and alarming affection. Immense quantities of blood are often lost in this way, and the greatest degree of debility thus induced. Indeed, the dense congeries of minute vessels, spread out upon the lining membrane of the nasal cavities, become, from a repetition of these bleedings, so weak and relaxed in their structure, that they are ruptured or become patulous upon the slightest efforts, such as sneezing, blowing the nose, coughing, and the like. In such cases, the hemorrhage commonly breaks forth suddenly, and without any warning, unless when the attack is brought on by some special mode of excitement, as exposure to the heat of the sun, or a fit of anger, or other passion. These determine a coincident pain in the head, flushing of the face, weight or tension across the forehead, flashing of light before the eyes, and other tokens of a tendency to apoplectic seizure.

These may or may not be relieved by the epistaxis, and it will, therefore, be unsafe to depend upon it; the patient should be treated as if it had not occurred, and with a view to obviate the danger of cerebral affection, to which he is so clearly exposed.

When epistaxis becomes atonic, it is exceedingly difficult to check or restrain it, and we must call in to our aid the mechanical resources of surgery. Astringent solutions should be injected up the nostrils, and powdered galls and alum blown into these cavities. A modern writer has recommended very highly the same use to be made of powdered gum acacia. The head should be thrown slightly back, the shoulders elevated. The old modes of applying pressure by the introduction of tents, simple and medicated with astringents, have been ridiculed by Abernethy, who declares, however, that he had always succeeded "by the introduction of a cylindrical plug of lint through the anterior nares, large enough to fill the tubular part of the nostril, wetted and wound round a probe, passed along the floor of the nose to the posterior aperture, but not into the throat. The probe to be withdrawn, and the lint left until the pressure and the formation of a coagulum had fully restrained the bleeding." In the meanwhile, the requisite measures of revulsion should be instituted, and a proper course of general management followed. A blister should be applied to the back of the neck; the bowels, if before constipated, gently moved by laxatives, and some astringent tonic, as the infusion of cinchona, or the muriated tincture of iron administered in the requisite doses.

I omitted to mention, in its proper place, a mode of arresting epistaxis, first introduced by Negrier, and which has received commendation and confirmation from several sources. The arm of the same side with the nostril from which the blood is flowing is raised high above the head, and kept steadily in that position, while the patient is made to stand up with his head erect, and the nostril is compressed with the finger. The explanation of the success of this mechanical remedy is given by M. Negrier. When the arms are allowed to hang by the side as usual, much less force is required to propel the blood into and through them than when they are raised up above the head; of course the force of the heart's action is only proportionally directed to that channel, and the current into the carotids and vertebral arteries receives a large share of the impulse from behind. But when this is differently divided, and the circulation in the brachial vessels requires a greater part of the force, on account of the position of the arms, the cerebral circulation must receive less, and the bleeding vessels will be less distended.

Watson tells us that Dr. Gregory, of Edinburgh, found that he was able, in this way, so much to diminish the force or quantity of the blood circulating in the brain as to bring on syncope at will.

Negrier also speaks of it as remedial in encephalic hyperæmia; and I know a patient subject to severe and frequent headaches, who assures me that he has found greater alleviation from persisting in this elevation of his arms above his head than from any other means of relief whatever.

Hemorrhage from the *mouth*, the *gums*, *fauces*, and *tongue*, very rarely occurs independently of some accident, or in the train of some constitutional disease. It is met with as a part of the history of scurvy and of purpura, but these, as I have already intimated, are something more than mere hemorrhages, involving universal cachexy, a degenerate state of the blood and all the fluids derived from it, and a peculiar breaking down even of the solids of the body.

The bleeding from the mouth, which among other hemorrhages, shocks and annoys us so much in the latter stage of malignant fevers, is a very bad symptom, and is of very difficult management. The altered state of the fluids in these cases, is abundantly shown in the dark and attenuated quality of the blood thus discharged, and in the intolerably fetid odor which it gives out. Yet, it is not always either thin, dark, or disagreeable to the smell. I have seen it exhaling from the unbroken surface of the gums and tongue, of a bright red, of ordinary smell, and readily disposed to coagulate.

A very interesting case of bleeding from the gums is related by Dr. B. Coates, in the July No. (1828) of the *North American Medical and Surgical Journal*. The subject was of a family noted for hereditary predisposition to dangerous and fatal bleeding from slight causes. A tooth had been extracted, from the socket of which a half-gallon of blood was lost in twenty-four hours. After many attempts, assiduously persevered in for five days, to check the flow of blood from the lacerated spot, the hemorrhagic tendency spread itself to all the vessels around. Dr. Coates says he distinctly saw the hemorrhage proceeding from "the surface of the uninjured gum." This patient recovered after bleeding for the space of nine days.

In several instances of a similar nature, that have come under my own notice, it has appeared to me that the bleeding was kept up, increased and extended, by the use of washes and styptics, which acted as local stimulants, thus augmenting the determination to the vessels affected and those immediately adjoining.

It is evident, that the effect of such applications must be injurious at least in entonic or active hemorrhage; I cannot think them proper or innocent even in the contrasted forms of passive atonic character.

It may be well to try, in the first instances, the milder astringents, holding ice and iced water in the mouth, washing with moderately strong solutions of acetate of lead, sulphate of zinc or of alum, infusions of bark, of kino, of catechu, of galls, or the rind of pomegranate. These failing, I resort without delay to the employment of the nitrate of silver, which seems endowed here with peculiarly happy powers. I know not what portion of its efficacy should be attributed to its chemical influence upon the animal fluids. It has, however, a prompt and obvious action upon them. It seems to coagulate directly the albumen which they contain. I have often seen the crimson surface of a tongue, lip, or gum, from which the blood was fast exuding, assume, under its repeated application as a lotion, a paler hue, and the bloody exhalation at once suspended. We may aid its good effect by pressure, and, with this view, pledgets of lint soaked in its solution, made of the strength of 8 to 10 grains to the ounce of pure water, may be laid upon the bleeding gum or tongue, or the mouth partly filled with them. I have seen this plan effectual in checking a hemorrhage which nothing else could restrain, and which, having debilitated the patient to the last degree, threatened quickly fatal results.

A case is related in which the bleeding from an infant's gum, incised to relieve the annoyances of teething, was restrained, after everything else failed, by the pressure of a mould of glazier's putty.

While making use of these local remedies, we must not neglect the due attention to the state of the general system. If the case be of the active or entonic form, we may diminish the vascular action and derive from the affected part, by the exhibition of a purgative, giving preference to the saline cathartics. A blister may, with advantage, be laid upon the back of the neck or between the shoulders, and the head subjected to the impression of cold, by pouring iced water, in a full stream, from some height, upon his occiput.

If, on the other hand, the patient be in an enfeebled atonic condition, he should be treated with astringents and stimulants, and induced to partake, notwithstanding the inconvenience offered by the hemorrhagic affection of his mouth, of nutritive fluids in such amount as may be required to sustain and invigorate his system.

Hæmoptysis.—Under this appellation, which literally signifies *spitting of blood*, I propose to treat briefly of all hemorrhages from the organs of respiration—the larynx, trachea, bronchi, and lungs. It is one of the symptoms or attendant circumstances of phthisis pulmonalis, and occurs not very often as an original affection. Andral remarks, that not more than one-fifth of his cases of hæmoptysis were free from tubercular disease. According to Morton, the sources of hæmoptysis are four. 1. The bronchial mucous membrane. 2. The pulmonary tissue. 3. The rupture of a vessel. 4. The parietes of abscesses.

The conditions under which it may occur are not less various. 1. It may attend upon active congestion suddenly developed in the lung. 2. It may be the result of a passive congestion. 3. It may arise from violent action in the organs of respiration; or 4. From violent general muscular exertion. 5. It may be the result of disorganization from disease.

Cullen has distinguished five species of hæmoptysis. 1. Hæmoptysis plethorica; which will include Laennec's pulmonary apoplexy as well as the other forms connected with inflammation and congestion. 2. Hæmoptysis violenta; from external violence, as blows and accidents of any kind. 3. Hæmoptysis vicaria; from the suppression of some accustomed evacuation. 4. Hæmoptysis phthisica; as connected with the various disorganizations of consumption; and 5. Hæmoptysis calculosa; supposed to arise from concretions within the lungs.

I have never met with any embarrassment in distinguishing hæmoptysis, though the books speak of cases in which the diagnosis is difficult. When blood is thrown out from the mouth frothy, and of a bright arterial red, with coughing or deep hawking, it is evidently from the respiratory apparatus; and this is usually the description of a sudden attack unpreceded by pulmonary disease. In some instances of phthisis, it is true, and such a case is at this time under my care, the blood expectorated is dark, grumous, and offensive, but this change in its qualities, by which it has come to resemble the blood thrown up in hæmatemesis and similarly altered in the stomach, is plainly ascribable to the condition of the patient. For the most part, too, hæmoptysis is preceded by certain oppressive and painful sensations in the thorax, tension or weight, or a pungent pang, or a feeling of stricture across the chest.

By a proper consideration of these antecedent symptoms, we shall often be able to ascertain the source from which the blood is derived. We distinguish bronchial, tracheal, and laryngeal hemorrhage, by the fact that it is unaccompanied usually by any of those tokens of respiratory distress above described, which attend upon or precede pulmonary bleeding. It usually comes on after a vehement fit of coughing, produced by a titillation in the air-passages. 2. Hæmoptysis from the pulmonary tissue, the pneumorrhagia of some modern writers, is the effect of a congestion of the vessels of that tissue, betokened by a train of constitutional symptoms which are rarely wanting. Laennec speaks of it as brought on by such circumstances as give rise at the same time to "an increase of the circulatory and a diminution of the respiratory function." There is a sense of heat and weight in the chest, dyspnœa, cough, and frequent pulse: the temperature of the surface is variable: the blood is of bright color and frothy. 3. Hæmoptysis from a ruptured vessel, is an accident of very unfrequent occurrence, though cases are recorded by both Bayle and Andral, and are occasionally met with in practice. It is affirmed by pathological anatomists that in proportion as bloodvessels are denuded by ulceration, their parietes become thickened at the expense of their caliber, and their function ceases. "Hence, we have so few hemorrhages of large amount in the latter stages of phthisis, and so few terminations of that disease in this way." It does happen, now and then, that persons in ordinary health rupture a pulmonary vessel of some size by violent muscular action, loud crying or singing, and the like. 4. Hæmoptysis from the parietes of an abscess, I am inclined to regard as much more commonly to be noticed among consumptives than writers have mentioned. The blood, in such cases, is apt to assume a dull dark tint, the flow returns at short intervals, gives out an offensive odor, does not depress the strength or spirits of the patient, who soon becomes familiarized to the appearance.

Hæmoptysis generally occurs between the age of puberty and the attainment of the full maturity of body, from the fifteenth to the thirty-fifth year. It is readily engrafted upon the plethoric or hemorrhagic tendency so generally developed, especially if there be any original malformation of the thorax, whether hereditary or otherwise. Thus, those who in early youth have been subject to epistaxis, are liable to it, and particularly if of slender make, with flat, narrow, or otherwise misshapen chest.

The *causes* of hæmoptysis have been already enumerated as those of hemorrhage in general, and while speaking of the conditions of the system with which it may be connected, we may again allude to these under the several modes of local or diffused excitement of the vascular actions by violent muscular exertion, as in playing upon wind instruments; the use of the blowpipe in the arts; loud speaking, singing, and reading; running, leaping, etc., all which call for intense respiratory efforts, and thus produce pulmonary congestion.

The *prognosis* in hæmoptysis will depend upon a due consideration of the circumstances already discussed. If a large vessel be ruptured, the danger must, from the structure of the parts and the importance of the organs concerned, be necessarily very great. In the far more common case of hemorrhage from congestion, that state of the lungs which McIntosh and others after Laennec, have been fond of calling a pulmonary apoplexy, the pneumo-hemorrhagie of Andral, the danger may also be imminent from the quantity of blood, which, escaping from the vessels of the mucous tissue lining the tubes, fills the cells, prohibiting the entrance of air and threatening suffocation. This will rarely happen, however, if the patient be of ordinary vigor. I have seen many very terrible and menacing hemorrhages of this nature, but none immediately fatal.

Hæmoptysis occurs in so large a proportion of patients who die of consumption, Andral says "five-sixths," that we should always be suspicious of the condition of the lung in the subject of it. The illustrious Frenchman just quoted tells us, he "once only (*une fois seulement*) saw a death from bronchial hæmoptysis, broncho-hemorrhagie," in which the pulmonary parenchyma was perfectly sound. In all others, he found tubercles in different stages of development. This almost uniform coincidence has led some writers to the opinion that hæmoptysis may be a cause of the formation of tubercles, especially as it is, in some instances, the very first symptom presented of pulmonary disease. I am, however, rather disposed, on the other hand, to regard the presence of the tubercle as predisposing to hemorrhage by the mechanical disturbance it occasions in the circulation near it. At any rate, if a mere coincident, and neither cause nor effect of the hæmoptysis, it would show such a morbid state of vascular and nutritive

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s consequences. The first which I shall mention is that hæmo-
which is vicarious of, or substituted for, some accustomed evacu-
natural or morbid. For example, I have had under my care a
lady, who, for many years, while laboring under amenorrhœa
menorrhœa, coughed up almost incredible quantities of blood.
seen her, while engaged in conversation, repeatedly eject, in this
om six to eight ounces at once, with very little apparent incon-
e—nay, with scarcely an interruption to her voluble discourse.
was short and corpulent, though in ill health.

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us. Nay, the surface is ays even reddened, but some-
times offers quite a natural aspect. pulmonary apoplexy—pneumo-hemorrhagie—there is infiltration of blood throughout the smaller air-cells and tubes; the very tissue or parenchyma, indeed, seems sometimes broken down, and scarcely distinguishable from the clots or coagulated masses. This is a condition which I have never seen, but both Laennec and Andral speak of it as not very infrequent. The latter writer tells us, also, that he has found the cavities of abscesses, when they existed in the lung, filled with coagula.

The *treatment* of hæmoptysis must be regulated very much by the condition of the patient, as well as by the circumstances of the attack. If the pulse be full and strong, and the subject robust, or at any rate of tolerably firm constitution, it may be well to resort at once to the lancet. The quantity of blood to be taken must be determined, in a great measure, by the tolerance of this mode of depletion. In pneumo-hemorrhagie, very full venesection is required, and generally borne exceedingly well. McIntosh, and some other practitioners, both in Europe and this country, seem to me to have pressed the remedy to an extreme. I would advise some caution in the matter. This is, perhaps, as often entonic in its commencement as any of the hemorrhages, but in subjects previously invalids, or in any manner debilitated, it will not be difficult to convert the case into a passive or atonic one, by ultra depletion, when our embarrassment in the conduct of it will, of course, be grievously augmented. Pains must be taken to determine from the thorax, and equalize the force of the circulation. Warmth should be applied to the extremities, and irritants, in various forms, to the surface of the limbs and trunk.

One of the most efficacious remedies for hæmoptysis, and at the same time always convenient, always at hand, is the chloride of sodium—common table salt. It may be eaten by the teaspoonful, or drunk in strong solution; and there is no reason to dread an overdose, for if the quantity taken should offend the stomach and occasion vomiting, this will be of no injury to the patient. It is a doubtful question how this article acts in restraining the flow of blood. The precise mode may, perhaps, be difficult to point out, but I am inclined to regard it as a revulsive, irritating promptly the whole mucous surface of the œsophagus, and thus deriving from the pulmonary surface. I am not aware that it possesses any direct styptic or astringent quality.

Emetics and nauseants are highly recommended by numerous authorities. The influence of the former may be occasionally injurious, however, from the muscular exertion and straining to which they give rise. Cullen mentions an instance in which the hemorrhage, for which he had administered an emetic, had been alarmingly increased by it. I do not hesitate to say, notwithstanding, that my own experience has been rather favorable to the use of emetics; the nauseants which I frequently prescribe, have repeatedly produced vomiting with no disadvantage; nay, on several occasions, with apparent benefit. Yet, perhaps, it will be the safer practice to abstain from full or vehement emesis. For the production of nausea, ipecacuanha in small doses, half a grain every five, ten, or fifteen minutes, is the most manageable article in the materia medica. Squill and digitalis are also employed in a similar way.

In the future management of the cases, several of the neutral salts are made use of in combination with our nauseants, as sedative and refrigerant. The nitras potassæ is, perhaps, the best of these. To obtain its full effect, it must be prescribed in large and free doses. To the effects mentioned above the sulph. magnesia, or Epsom salts, adds a purgative operation, and deserves, therefore, a preference in many instances. It is prompt in its action on the bowels, deriving usefully from the oppressed organs, and with a very obvious power of reducing vascular excitement, both directly and indirectly, seems to me to combine something of the peculiar adaptation to the circumstances universally ascribed to the common table salt.

Entonic hæmoptysis is usually controlled by the measures above indicated—if promptly instituted and energetically carried into effect—as, depletion by the lancet and cathartics, reduction of vascular excitement by nauseants, refrigerants, and sedatives, and the use of common salt. A sort of secondary condition of the system, intermediate between its entonic and atonic states, is now presented, and the hemorrhage, if not checked, assumes a corresponding character, transitive from the active to the passive form, which demands certain modifications of our treatment.

It is at this stage that we shall derive the fullest advantage from the acet. plumbi; which, whether as a mere astringent, or by some more obscure and specific efficacy, often exerts a highly beneficial influence.

Great caution has been thought necessary in its administration, but I have not seen any injury from it. In threatening cases, two, three or four grains may be given every hour. It is most useful, I think, when combined with ipecac. and opium. This latter medicine is especially called for, and, indeed, indispensable, when there is present any degree of continued irritation in the air-passages exciting cough, and its exhibition should be carried to the full extent required for subduing this irritation.

The revulsive influence of epispastics, is to be resorted to under these contingencies. They should be laid in succession upon the thorax, the arms, the back of the neck, and the lower extremities. They are particularly demanded when any tension, oppression, or pain in the chest remains after venesection has been carried to the proper extent; these symptoms they often remove at once.

I have not yet mentioned the antimonials, which, however, constitute the principal reliance of many practitioners in entonic hæmoptysis. I will not deny their efficacy, yet I regard them as adapted rather to such hemorrhages as are connected with and dependent upon pulmonary inflammations than to hæmoptoe proper; and I would further advise them to be watched with great care, as their continued exhibition tends strongly to depress the tone of the constitution, and to convert active into passive hemorrhage. The tartarized antimony is the most certain and perhaps most manageable. It may be prescribed alone in solution, or to establish a tolerance of it, with tinct. opii; or combined with the nitrat. potassæ in such doses as the stomach will bear. James's powder, or the pulv. antimon. of the shops, may be serviceably administered with pulv. digitalis, to which the sulph. potass. or nitrat. potass. may be added—by the one determining moderately to the bowels, by the other to the kidneys. If, from these formulæ, occasional nausea or even moderate vomiting should occur, this will probably do no harm to a subject of ordinary vigor, though it might injure a very weak patient.

Atonic hæmoptysis will require a very different course of treatment for its relief. The patient will be languid; his pulse frequent and feeble; his skin cold; and his breathing rendered difficult, not only by the effusion within the air-passages, but by actual want of muscular power to sustain the fatiguing efforts in respiration. Let him recline, well supported, with his shoulders somewhat elevated. Table salt should be given him quickly by the teaspoonful, and his chest and extremities subjected to the revulsive effects of heat and irritants—mustard poultices and the like. We must not shrink, if his condition demands it, from a prompt resort to the class of diffusible stimulants, of which camphor and ammonia are to be preferred. Such pulmonary irritation as may be present, must be allayed by the exhibition of opium, to which the acet. plumbi, in large amount, should be added as a safe and efficient astringent. Alum may be employed for the same purpose in full doses. Vesicatories should be applied early and repeatedly.

If the case protract itself, the more permanent tonics must be had recourse to. Bark and iron—the strong infusion and the muriated tincture, must be administered alternately. Wine, ale, or porter should be ordered, and a nutritious and even stimulating diet allowed.

Convalescents from hæmoptysis must be laid under strict control; restrained, for a sufficient length of time to give opportunity for a restoration of the healthy condition and function of the lungs—as to the employment of the voice. In severe cases, especially of the atonic form, they should be absolutely prohibited from speaking, even in a whisper. Great care should be taken to protect them from the impression of any of the exciting causes of hemorrhage.

When we judge it prudent that they should be permitted to take exercise, we must graduate cautiously the degree of exertion and exposure. Swinging, sailing in moderate weather, riding at first in an easy carriage, and afterwards on horseback, should be in succession resorted to; and such habits of conduct and course of life begun and fixed as are best adapted to give tone and vigor to the debilitated constitution.

HÆMATEMESIS.—Vomiting of blood. Blood thrown up from the stomach is usually grumous, imperfectly coagulated, dark colored, and mingled with mucus and other contents of the affected viscus. The act of vomiting is preceded by oppression at the scrobiculus cordis, a feeling of faintness, and sometimes a pungent pricking pain in the stomach.

The absence of cough and other irritation of the respiratory apparatus, the darker color and grumous appearance of the blood discharged, and the attendant nausea, faint sickness, and gastric effort, will, in almost every imaginable case, prevent the possibility of confounding hæmatemesis with hæmoptysis.

The *causes* of this hemorrhage are often obscure, and it occasionally comes on quite unexpectedly, and without any warning. It is most apt to be met with in subjects broken down by habits of intemperance and debauchery. It may be brought on by blows on the pit of the stomach; perhaps by violent straining to vomit; by obstructions to the regular and normal course of the abdominal circulation, as by tumors within that cavity, and by pregnancy; and by the suppression of some accustomed sanguineous evacuation, as the catamenia in women, and hæmorrhoids in men.

In general it is not a disease of very great danger, though in some instances the discharge of blood is large and rapid, and there is more immediate and greater prostration of strength and apparent exhaustion on the part of the patient, than is observed in other hemorrhages proportionally. The circulatory system seems to succumb more promptly under the effusion of blood within the stomach, and from the vessels of the gastric surface, than elsewhere; the pulse becomes weak, and the subject of the attack sinks almost at once into an atonic condition.

The *treatment* of hæmatemesis is not well settled. If the pulse be hard, or even of moderate firmness, and the general strength not decidedly impaired, and more especially if any symptoms of local or diffused excitement present themselves, such as heat of skin, pain and throbbing at the pit of the stomach, it may be proper to have recourse to venesection, though even now the use of the lancet will require some caution. Under the same circumstances, laxatives—preferring the neutral salts—may also be advised. Ice, swallowed in pellets, or frequent small draughts of iced water, are likely to be useful here also. In the meanwhile, counter-irritation must not be neglected, and the skin over the stomach and of the abdomen widely, should be reddened with mustard.

In the great majority of instances, however, there is no necessity for depletion, in any form. All evacuants are unadapted and inadmissible, and the immediate exhibition of astringents is imperatively called for. These produce so much more certainly and quickly a good effect, as they are applied directly to the bleeding surface. The acet. plumbi is the most valuable article of the class, and may be administered either alone or in union with opium, which has a happy influence in subduing the irritability of the disturbed stomach. Two to four grains of the salt of lead may be prescribed with one-fourth of a grain to a grain of opium, to be repeated *pro re nata.*

The muriated tincture of iron has a high reputation as a styptic here, given in doses of twenty to thirty drops in cold water, every half hour or hour. All the vegetable and mineral astringents have been duly experimented with. Alum is preferred by many. The nitrate of silver is loudly extolled, and in protracted cases will be found very serviceable. Others select the vegetable articles, kino, catechu, the infusions of bark, nutgalls, and the rind of the pomegranate. Turpentine is strongly recommended, and I have seen it useful. Creasote is preferred by many. From analogy, both are employed in the hemorrhagic state of our fevers, and for the purpose of checking the black vomit. Where stimulants are necessary, brandy, with iced water, will be found both efficacious and convenient.

In the meanwhile, the abdomen should be extensively irritated with mustard and vesicatories, and the extremities kept carefully warm and similarly excited.

The bowels may be moved by enemata, or, if necessary, by a mercurial cathartic, or with spirits terebinth. Constipation must be carefully avoided, as a condition very evidently opposed to a complete recovery. In the vicarious hæmatemesis of women, Hamilton affirms, and he is sustained by numerous and respectable authorities, that the exhibition of purgatives, continued in his characteristically slow and prudent manner, will be found more effectual in restoring health than any other plan of management.

The convalescent should keep the trunk of the body well enveloped in flannel. His diet should be generous and nourishing but light; and care should be taken to avoid oppressing the digestive organs by undue quantities of food. The impaired tone of the stomach may be improved by the use of an infusion of bark, with some alkali. Port wine diluted is often a serviceable beverage, though stimulants must be used moderately. Some have advised the mineral acids. I prefer to depend upon iron, when it is requisite to persevere in any medicinal formula; and the two may be combined, as in the muriated tincture.

INTESTINAL HEMORRHAGE (*Hæmorrhagia proctica; Melæna*).—Like the mucous membrane of the stomach, that of the intestinal tube, from the pylorus to the rectum, is subject to the hemorrhagic condition, which may supervene either independently or in combination with other elements of disease, as in dysentery and hæmorrhoids. Blood discharged by the anus is apt to be grumous and black, probably because acted on by some of the gases always present in the alimentary canal, and exhibiting their influence even on that which is vomited, though in less striking degree.

When it assumes the contrasted hue, and is florid and of natural appearance, we infer at once that it proceeds from some vessel or portion of the surface near the extremity of the rectum, or that its source is abundant, as when some large vessel, especially an artery, has been ruptured or eroded. Hemorrhage takes place from the upper portion of the bowels, probably on account of some impediment to the normal circulation in the abdominal viscera, as from chronic hepatitis, splenitis and other tumors. The few cases of well-marked melæna that I have ever had under my care, were obviously connected with hepatic derangement of long standing.

I have seen two instances of promptly fatal hemorrhage from the bowels. One of them, formerly mentioned, was a convalescent from remittent fever, in whom was discovered, on examination *post mortem*, an ulcer that had eroded the coats of a large vein. The other happened during seeming recovery from cholera Asiatica, in a black, who was buried without affording the opportunity of inspecting the parts.

The effect of these hemorrhages upon the system differs much in relation to its source and attendant circumstances. I have seen very large discharges of blood occur both in fever and dysentery, without sinking or exhaustion of the patient, although reduced by previous disease. A surface, in a state of inflammatory congestion, contains a great quantity of blood, already virtually subtracted from the circulating current, which may exude from it, unloading its minute vessels without injury to the subject; whereas, if the same amount were drained off abruptly from a vein or artery of notable size, the result would be syncope, prostration, and perhaps death.

I have notes of five cases of spontaneous flow of blood from the anus, independent of the existence of hæmorrhoids, or of the presence of any other intestinal or abdominal disorder. In each of these the discharge trickled away from the rectum, either before or after an alvine evacuation, or without any effort at stool, in various quantity and at different intervals. They were all easily relieved. Rest was enjoined in a recumbent posture, for a short time, during which they were kept upon a low fluid diet. Mild laxatives were given, for in all, constipation was present, and clysters of cold water were thrown up several times a day. After the disease seemed to be thus subdued, it was thought proper to advise the occasional employment of enemata, containing some of the mild vegetable astringents.

HÆMATURIA (*Hemorrhage from the urinary organs*).—This discharge generally occurs after some accidental violence has been applied to the perineum, and probably arises from laceration of the urethral membrane, tearing open some of its vessels. It occasionally follows upon unduly vehement muscular exertion, as in lifting weights, leaping, riding on horseback. Contrary to the observations of Good and others, the majority of the cases that I have met with, presented a flow of pure blood, generally unmixed with urine. One of these was singular in its history. The hemorrhage came on only after coition, and was almost uniformly attendant upon that indulgence. It was exceedingly difficult to restrain or control, and reduced the strength of the patient so much, that he sunk gradually, and died of dropsy.

Hæmaturia rarely shows itself unconnected with disease of the kidneys or bladder; yet I had long under my care a stout and otherwise healthy young man, frequently attacked by this hemorrhage, in whom I could not trace it to any of the sources above mentioned; either accident, violent muscular exercise, or previous or coincident disease of any character. Willis mentions that "a kind of endemic hæmaturia prevails in the Isle of France, without appearing to prejudice the health of the children, among whom it chiefly occurs."

This hemorrhage is generally met with among the young and robust, assuming a marked entonic character. It is for the most part relieved without much difficulty by absolute rest in a recumbent posture, low diet, venesection, perhaps, or topical bloodletting by cups to the loins, cold applications to the genitals and lower part of the back, as by sitting in cold water, and by affusion, and the exhibition of some mild but efficient cathartic. Objections have been made to the saline purgatives, but I use the sal Epsom without any obvious inconvenience. If it appear tenacious, the acet. plumbi will be found useful; and not less so in accidental than in spontaneous hæmaturia. I succeeded in checking with it, administered in free doses, a hemorrhage from the urethra, arising from a severe blow with a stick in the perineum, which had bid defiance to the application of all the other remedial means commonly employed in such cases. Next to the acet. plumbi, among our astringents, I have seen most benefit from the muriated tincture of iron.

To prevent the recurrence of the discharge when it has been checked, the patient must be enjoined to remain for some time quietly at home; and when allowed to resume his usual avocations, he should move about gently and with caution, avoiding all rapid action, and every violent muscular effort.

CACHECTIC HEMORRHAGES.

PURPURA.—This disease occurs in two forms or varieties, both of which have been arranged by some writers among the eruptive fevers (William and Elliottson), both under the head of scurvy (Good). Indeed, there are many pathologists who confound it with the latter; some making no distinction at all; others separating it, as Craigie does, under the name of land scurvy. I think we shall see reason to consider these views untenable. Both the diseases are undoubtedly to be classed among cachexies, on account of the universal deterioration of the condition both of the solids and fluids of the body, and both exhibit the hemorrhagic tendency. But there are points in the description of each entirely peculiar.

Purpura simplex consists in a subcutaneous hemorrhage, showing itself in small circumscribed spots over the surface, petechial, maculous. These may be as small as insect bites, very numerous, usually in patches; they do not disappear on pressure. I have seen them prettily defined, circular, as large as buckshot, black or dark blue, scattered over a clear, healthy looking skin, and attended with very little sensation of ailment or discomfort. Generally speaking, their presence is accompanied by febrile excitement, with flushed cheek, the color being of a dark red and circumscribed; the tongue is red and furred; there is uneasiness or pain of stomach and nausea, with epistaxis—perhaps some hæmoptoe. In a robust young man whom I saw, there was, with an extensive petechial spotting of the whole surface, a marked sallowness of countenance, with sharp, cutting pains in the stomach. Wilson tells us of "red perspiration which owes its coloring principle to blood"—or rather "oozing of blood in a diluted form through the skin." In a young lady under his care, "a red-colored fluid distilled from five circular spots on the face—on the forehead, cheeks, and chin."

The *prognosis* is favorable. These cases never degenerate, it is said, into the severer form—of which we shall speak directly; and hence we may infer that they are distinct, notwithstanding the resemblance. I have certainly never seen them intermingle. In purpura simplex, there is very little general or constitutional disease; and if it be sometimes protracted, this continuance is the only evil.

The *treatment* is usually at first by mild purgatives, rest, and a cooling diet. The gastric uneasiness in the instance above referred to, rendered it necessary to allow free doses of morphine, which soon proved efficient. The greater number of my patients have been females, who, after a short time, were put upon bark and iron, and recovered perfectly and readily. They also seemed to derive advantage from the sulph. acid. aromat., which they took combined with the infus. cinchonæ.

Purpura Hæmorrhagica.—This is a severe, annoying, dangerous, and obstinate disease. It seems to consist in a universal vice or perversion of both sanguification and nutrition. A general hemorrhagic disposition prevails; on various parts of the surface there are extensive and diffused ecchymoses, and every blow or hard pressure makes a dark discoloration; the gums become swollen, dark, and spongy, and ooze blood continually; hæmaturia very often attends, and sometimes intestinal bleeding. The blood is black, often offensive, grumous, not forming a firm coagulum generally; though it is said sometimes to be buffy, and the serum of pink color; there is great muscular debility, with much arthritic pain, especially in the large joints, the ankle, the knee, the elbow, and wrist; the pulse is full but feeble, frequent; there is much thirst; constipation of obstinate character often attends; there is pain in the back, in the region of the kidneys; sleeplessness, and a low muttering delirium. The skin sometimes is broken over the ecchymosed parts, and a thin blood oozes freely. Wilson mentions "a young woman in whose case blood escaped from her ears, fingers, toes, corner of one eye, chest, foot, hands, chin, and tip of the tongue;" and "an infant said to have bled several days at the shoulders, waist, arms, and fingers' ends." Graves gives us, on the authority of Dr. Boxwell, of Abbyleix, a case of purpura, "in the course of which effusion of blood took place into both eyes, destroying vision entirely. The blood was extravasated in the first instance, somewhere behind the iris in the right eye. Next day the other eye became similarly affected. She died about a week afterwards." As the disease progresses the face becomes pale, or sallow and puffed; the feet are œdematous; the joints are swollen; the skin between the dark patches is rough and harsh; the strength fails rapidly.

Anatomical Lesions.—The internal surfaces of the serous and mucous tissues are found discolored by extravasated blood, and blood, either fluid or in clots, is seen within the pleura, pericardium, peritoneum, and in the substance of the brain. The blood is defibrinated, in a remarkable degree, in this disease; yet it is said there are exceptions. There is general softening of the parenchymata; the spleen, especially, is found large and friable.

The *prognosis* is doubtful; the duration of the cases indefinite, and there is tendency to relapse or return; the convalescence is tedious and irregular.

Diagnosis.—However much it may resemble scurvy, it is, I think, clearly distinguishable from it. The causes of scurvy are known and obvious, although they vary somewhat, as we shall see. There is always something in the condition of the patient and the circumstances which surround him, fairly explanatory. Not so in purpura. I have known it to attack persons in the best position, living generously but temperately. I met with an exceedingly bad case in the mountains in autumn, in a region of remarkable salubrity, in the season of fresh, ripe fruits, in a well-fed, athletic, temperate young man; he was covered with ecchymoses, and bleeding constantly from his swoln, discolored gums, and occasionally and largely from the nostrils. The absence of several common symptoms of scurvy will be hereafter dwelt on.

The *causes* of purpura are altogether obscure. I have met with both forms under the best contingencies of civilized and refined life, and in both sexes. I think the hemorrhagic form most frequent among men, as the simple is among females.

Treatment.—A plethoric or sthenic variety is described by some writers in which venesection has been found useful, if not indispensable. I have never seen any such case. Looking upon the disease as consisting essentially in a deterioration of the crasis of the blood and a breaking down, so to speak, of the solid tissues, involving such a change in the relation between them and the circulating fluid as to keep up a constant danger of fatal, though perhaps gradual, hemorrhage, I have endeavored to alter the whole condition of the system.

Tonics and eutropics are called for; constipation must be relieved; the tone of the digestive system restored. I prefer to commence by free doses of the resinous cathartics. Keeping the bowels soluble, I administer the alkalies, often with diuretics, the urine being scanty and high colored, and often tinged with blood. Small doses of tinct. colchici with the acetate, or carbonate, or citrate of potass, I have found to answer best. Oil of turpentine is highly recommended by many, and must, by the reports, have done good in certain cases. I have not succeeded with it. One of my patients, to whom I had refused it, took it freely on his own responsibility, and did himself decided harm with it, increasing his hæmaturia, with much gastric irritation. Opium is required generally in full doses to relieve the severe pains in the back, and limbs, and joints. I use warm fomentations to the swoln parts. The hemorrhages from mouth and gums, nostrils, &c., often demand immediate attention. Astringents must be promptly exhibited—the acet. plumbi, tannin, elixir vitriolicum. To remove the fetor and sponginess of the mouth and gums, it will be well to employ the chlorine washes, with cinchona and myrrh.

Iron is our best tonic, and should be administered largely: the simple rust and the muriated tincture are preferable. If the patient's strength fail, he must be allowed port wine and brandy, with nutritious fluids, milk, and broths. If he can bear the cold bath, and the season permit, it will be found advantageous. Change of air should be recommended, and free exercise, especially on horseback, when convalescence is established.

Scurvy (*Scorbutus, sea scurvy, land scurvy*).—This disease may be defined to be a most intense cachexy or vitiation of the solids and fluids in consistence and composition, with tendency to hemorrhage from various surfaces. I know no difference between the cases occurring at sea and on land. It has long been, and I fear, with all the improvements of science, will continue to be the scourge of protracted expeditions at sea; on land it has been one of the annoyances of ill provided armies from the time of Louis IX. in Egypt to the siege of Sebastopol at the present day.

It commences with languor, paleness, anorexia, or sometimes, on the contrary, an inappeasable and morbid appetite; much gastric uneasiness; the respiration is easily hurried and rendered difficult by muscular exertion; there is thirst, drowsiness, but unrefreshing and imperfect sleep; the strength is impaired; the pulse is frequent but soft; the gums grow spongy and black, leave the teeth bare, and bleed frequently, or constantly, with great fetor, extensive ulceration often, and sometimes exfoliation of alveoli. There is great dejection of spirits; the complexion is greenish; as the disease progresses the surface is cold, puffy, swollen, pale, with cutis anserina; constriction of chest and panting ensue; syncope after exertion; ecchymoses; pains in joints and limbs; nodosities on the bones and induration of muscles, especially of the thigh and calf of the leg; vesications, from which ooze blood and serum, becoming foul ulcers; old sores and wounds break out and bleed, and old fractures grow soft; bowels are sometimes costive, sometimes urged with diarrhœa; there is intense nostalgia, with delirium and hallucinations; dropsical effusions fill the cavities sometimes; death ensues after muscular effort, or on rising to the erect posture.

Autopsy.—The blood is dark and incoagulable, and is effused among the tissues; the lungs and pleura are full of bloody serum; the bones and joints are often carious; the spleen is enlarged and friable; the consistency of most of the solid parts impaired.

Pathological Character.—Scurvy is a cachexy in which sanguification is vitiated, and nutrition defective, morbid, and irregular, presenting in some parts deposit or induration, in others, softening, absorption, and ulceration. The crasis of the blood is broken down, it is defibrinated; the tissues are unduly permeable, with serous exudation and hemorrhage. It was anciently regarded as a poisoning of the blood by saline impregnation; Garrod, recently, maintained that it depends upon a deficiency of the salts of potass in the fluids and solids.

Diagnosis.—However much a single case may resemble sometimes one of purpura, in the mass the distinction can be readily drawn by reference to cause—to surrounding circumstances—to the indurations of muscular parts and the nodosities of bones which belong to scurvy, and the ulcerations and removal of eschars and the disunion of fractured bones; as also to the very different methods of cure.

Prognosis.—This is unfavorable or otherwise as we can or cannot remove the cause producing it, or change the contingencies under which it has occurred. After a certain point of failure of system, the hope of recovery is, of course, lessened; but restoration often takes place from very serious symptoms.

Cause.—Scurvy is most often met with in protracted sea voyages, and has been ascribed to all the conditions which attend upon such protraction; a salt, stale, innutritious, monotonous diet; bad water, and scarcity of water; cold, fatigue, dampness; bad air, or want of ventilation; the tedium of confinement; disappointment, and failure. On land, similar causes produce similar results—as we meet with it at sieges, and in prisons, and workhouses where the diet is meagre and unnutritious, and the spirits are depressed.

It has occurred in some obscure examples, where its source is not very obvious, as recorded by McGregor, "in the English army in Egypt, when the army was liberally supplied with fresh vegetables and other provisions;" in Lord Anson's dreadful voyage "between Mexico and the Ladrones, when they had not only a considerable supply of fresh provisions, but were daily catching fish, and had a liberal supply of fresh water;" and more recently in "King's expedition, when it attacked the Beagle and Adventurer in spite of abundant and well-varied diet, lime-juice, and all things expedient." On land, it has shown itself under the use of very varied diet. In the famous instance of the Milbank penitentiary, many respectable physicians testified that the diet was good, and Craigie affirms that the disease prevailed after it had been improved in quantity and quality. Milman and Cormack tell us of persons affected with it while living on the usual diet of tea and coffee, bread, &c. &c., and Dunglison, of one attacked while on a vegetable diet in the care of a physician. Some cases have occurred in a cotton establishment on the usual diet of laboring negroes. If monotony and restriction be supposed sufficient to account for such cases, what shall we say of the immunity of our hunters and trappers of the west, and of the Indians, so often, and for so long time living on scanty and unchanged food.

Treatment.—The causes being assumed to be clearly known, the cure is attempted in the first place by its removal, and this is often at once sufficient. An instance is given by an English voyager, of the arrival of a ship whose crew were suffering terribly from scurvy, at a southern island of abundant fruit. On the day of arrival 21 persons died; on the next, but one; after which all promptly recovered. The mind must be cheered with hope, and the spirits raised by diversion and amusement; the food must be sufficient and of varied quality, An abundant vegetable diet, with fruits and fresh meats; a dry, well-ventilated apartment, baths, warmth, comfort, and recreation—these will, of themselves, suffice, if attainable. "Potash," says Garrod, "is the true and essential antiscorbutic," which must be sought for and employed assiduously, under the unfavorable circumstances of protracted confinement and exposure at sea or ashore. All agree in the preference due to the Irish potato. It is best given raw, grated, or cooked, as Garrod warns us "unpeeled, to prevent the potash being boiled out of it." The same salt is found in leeks, garlic, turnips, onions, and cabbage; in all fruits, especially in lemon-juice, which is a mere supercitrate of potass; in wines, as a bitartrate; in vinegar, as an acetate; in yeast, and all fermented and malt liquors; in milk, in the proportion of 6 to 9 grains in a pint, and in fresh meats. All these are enumerated among antiscorbutics. Perhaps the highest place is generally accorded to lemon-juice, which is spoken of by many as a specific—by some as "infallible."

Patterson and Cameron accuse it of having occasionally failed, however, and eulogize extremely the nitrate of potass. Henderson, who also complains of his ill success with lime-juice, agrees with them as to the superiority of nitre: it is dissolved in vinegar, in the proportion of from ʒij to ʒiv with vinegar ℥vj or ℥viij—which should be taken by the patient in the course of the day. Lemon-juice is given in the quantity of from ℥iij to ℥vj or ℥viij daily; diarrhœa may be restrained by the addition of a few drops of laudanum—a teaspoonful of ether, or of gin, to each dose.

Numerous other specifics have been proposed. Copland speaks well of tar-water, and spruce beer, or the infusion of pine-tops—the chlorate of soda is extolled—all the mineral acids. Cook's success in preventing scurvy in his long voyages round the world was wonderful; in three years and eighteen days he lost but one man out of 118. He used, as preventives, malt, sowens, sugar, French acid wines, and sour-krout. To the use of this last article the immunity of the Dutch sailor is ascribed; I would lay some stress upon his national phlegm and passive character. Men should always be provided with a cheerful variety of occupation and amusement, and nostalgia—the strongest of all sources of predisposition—relieved by as prompt a return homewards as possible.

So much for antiscorbutics, as they are called, specifics, and prophylactics. The diversified symptoms under which the patient labors require attention; suffering must be relieved by proper remedies exhibited *pro re nata*. If costiveness prevail, the bowels must be moved cautiously, by resinous and oily purgatives; diarrhœa must be restrained by kino, tannin, and other astringents. Opium must be used freely enough to subdue pain and give refreshing sleep. The mouth must be washed with myrrh, bark, the chlorides, the mineral acids; the sores kept clean with the nitric acid diluted, as a wash, and their fetor lessened by the charcoal poultice.

Stimulants may become necessary, and tonics; wine and cinchona are the best. The recumbent posture must be carefully preserved; it is dangerous for the patient to rise to the erect posture. Lind affirms that men whom the officers had thought well enough to order them aloft, have fallen dead from the rigging.

HYDROPS.—(General Dropsy.)

The difficulty of defining what is not exactly understood, can never be felt more burdensome than in the discussion of the subject before us. We may describe the disease, *dropsy*, by reference to a single characteristic symptom—as "a preternatural collection of serous fluid in one or more of the cavities of the body, or in the cellular tissue;" but it is easy to show the error, pathologically considered, of thus confounding all serous collections.

Local collections of serous fluid may not necessarily depend upon, or even suggest, any impairment of the constitution, and hence may be very incorrectly classed with dropsies, properly so called, which, even when local in their origin, soon connect themselves with a most obviously cachectic condition of the general system. Hydrocele is the most exclusively local of all serous collections; for not only is it met with in persons otherwise in the most perfect and robust health, but it has not occurred to me in the most pervading instances of general dropsy, to find, at any stage, this distension of the tunica vaginalis testis, though the scrotum may be filled to bursting. Similar observations may be made, also, of what is called ovarian dropsy, the nature of which affection is doubtful and obscure. Hydrocephalus is, for the most part, insulated in this way, only showing its connection with the more familiar hydropic collections, by the fact of occasional metastasis taking place—the head becoming diseased on the subsidence of anasarca, hydrothorax, and ascites. These last are never, or, if ever, very rarely, presented to us independent of each other, as will be shown with certainty if their duration be prolonged or their progress unchecked. This almost uniform coincidence seems to prove their concurrent association with some predisponent or constituent condition of the general system, and of the truth of this view there cannot, I think, remain a reasonable doubt. Such state of the constitution is known as the dropsical diathesis, and will be often referred to in our disquisitions, as an essential portion of the pathological history of the disease under consideration. It is true that each of the above named forms of dropsy may, in their invasion, and during a brief course, exist in an insulated way. The least likely to present itself alone, perhaps, is ascites, and yet it is known, both from observation and experiment, to have been the result of causes purely local, nay, even merely mechanical, which have acted upon some of the contents of the abdomen. Hydrothorax may occur from mere inflammation of the pleura. Anasarca may be in a double sense local; as, first, where it is partial, the cellular substance of a single limb being thus distended, as is seen in sprains and other injuries; an instance of which is mentioned by Monro, where this symptom, after a fortnight's duration, was followed by the universal spread of the swelling; and also in the œdematous effusions in dependent parts, so often seen in the latter stages of protracted and debilitating maladies. Secondly, there are certain cases of anasarca where the cutaneous intumescence is extensively diffused, which I am disposed, nevertheless, to look upon as local, because unconnected, at least in the first instance, with any degree of hydropic diathesis. We meet with these as consequences of the exanthemata pretty frequently, especially of scarlatina and of erysipelas; and I shall by and by speak of a form of anasarca not uncommon among our black population, which I regard as of a similar nature. All these seem to me to be probably examples of merely local exosmose, from some local affection of the tissues concerned.

We designate the locality each collection of fluid is found to occupy by significant names applied. Hydrothorax, hydrocephalus, are terms which explain themselves. Anasarca is a conventional word to denote effusion which occupies the cellular tissue, and ascites is the title of abdominal dropsy.

Again, dropsies are known as symptomatic and idiopatic; the first of which are pointed out as consecutive upon some previous disease, and effects of some organic lesions of particular viscera; and the second, as unconnected with obvious precedent disease, and more obscurely and vaguely attributable to the general deterioration of the system—a form of cachexy spoken of as the hydropic diathesis. The existence of the latter condition has been denied, except as associated with some organic affection; but this cannot be always shown; its essential presence, therefore, must not be taken for granted. Farther, as dropsies present themselves in very opposite states of the body, in regard to strength and weakness, they are said to assume an entonic or atonic character, and in relation to the rapidity or slowness with which they supervene, and their connection with contrasted states of excitement and debility, have been termed acute and chronic.

A majority of the authors who have written of dropsy, have maintained the proximate cause of all its various forms to consist in the effusion of serous fluid, its most obvious and characteristic symptom; while a few, with a more liberal spirit of reasoning, have preferred to consider this effusion as one only of the train of effects attributable to a state of vascular disease, more general and widely extended. There is no more difficulty in this doctrine, than in the belief of the gouty diathesis as precedent and necessary in the production of every separate arthritic paroxysm; or of occult scrofula, the strumous diathesis, as the basis of tubercular and other lesions of parts.

The effusion and collection of serous fluid in some cavity or tissue, must be allowed to rank as an essential point—a *sine qua non*, in the description of dropsy; for it is the definite result, and the only cognizable token of that obscure morbid condition of the vascular system, which we allude to as the hydropic diathesis. Yet, on the other hand, if we make dropsy consist simply and directly in mere serous effusion, we render ourselves liable to numerous difficulties and grave errors. We shall thus lose sight of the obvious and important distinctions between collections of serum purely local, as in hydrocele and ovarian tumors, on the one hand, and those of general dropsies on the other; between œdematous affections arising from mere circulatory debility or mechanical injury, and the idiopathic effusions—between the results of local inflammation of certain tissues, and the true cachectic impairment of the condition of the fluids and of the exhalant and absorbent vessels. It should be remembered, too, that dropsy is not always cured when we have removed the whole collection of fluid, whether by paracentesis or by the efficient employment of hydragogue cathartics and diuretics. Nay, it is not unfrequent to notice in deaths from dropsy, a remarkable, and sometimes a total subsidence, previously, of the hydropic swelling.

All that is known of the minute pathology of dropsy, as stated by writers of the highest authority, seems to be comprised in the assumption, that there is no longer the due correspondence of action which belongs to the normal and healthy state of the functions, between the exhalants and absorbents which open upon the several cavities. It is taken for granted, that in all these cavities a serous fluid is poured out for the purpose, as it is expressed, of lubricating the surfaces, and that this purpose being answered, it is duly taken up and carried away again into the circulation. Some authors would ascribe dropsy to an excitement, others to a laxity of the exhalants; others, still, to debility or loss of power in the absorbents; the ultimate result in each being a morbid deposition or a failure to remove the fluid effused.

But these views are not free from difficulty. It is not proved that the occurrence of serous effusion into the several cavities of the body, is a natural phenomenon. J. Hunter affirms that "the juices which lubricate surfaces of living animals are in a volatile state." Others say that they have found no fluid at all in these cavities. It is noticeable more frequently, perhaps, in the ventricles of the brain than elsewhere, and there is no other cavity in the body less liable to dropsical accumulation. It should be remarked, too, that the cells of the cellular tissue constitute the most common seat of hydropic collections; yet no one, so far as I know, has maintained that these cells are, in health, filled with a serous lubricating fluid, removed as fast as it is deposited. If any surface be lubricated naturally, it must be that of the tunica vaginalis testis; yet this cavity never fills in general dropsy. We cannot imagine it to be so insulated as not to partake in the morbid changes of other secretory surfaces. Therefore, dropsy does not consist in mere loss of proportion, between exhalation and absorption.

The dropsical fluid closely resembles, in chemical constitution, the serum of the blood, differing from it, in presenting a somewhat diminished specific gravity and containing somewhat less animal matter. Vogel tells us that it usually contains less albumen and less fibrin. There is, however, a fibrinous dropsy in which the effusion is not deficient in that element, or contains it in undue proportion. But it exhibits an infinite variety of physical appearance and character. It is found limpid and inodorous, black and fetid, bloody, sanious, milky, green, oily, acrid, so urinous or ammoniacal as to turn syrup of red poppies green, gelatinous, and puriform; it has sometimes contained so much soda as to produce Glauber's salt on the addition of sulphuric acid. Hewson is the authority who most positively declares the presence of a lubricating fluid in the cavities of healthy bodies recently killed. He tells us that "it resembles, in every respect, the fluid found in the lymphatics, and approaches the nature of coagulable lymph." "When suffered to rest," he says, "exposed to the air, it jellies, or coagulates spontaneously in half an hour." Now this spontaneous coagulation very rarely happens in dropsical fluids. Baillie mentions it in one instance. I have met with it twice. It only occurs in a peculiar condition of disease.

Such statements show that a mere increase of exhalation or a diminished absorption from these surfaces would be by no means sufficient to account for the appearances in dropsy, and we are driven to the conclusion of the absolute necessity of some specific morbid condition of the tissues concerned, which permits the escape—the exosmose—of the serous, and, perhaps, the fibrinous portions of the blood, while the coloring matter is retained. We shall find, too, as we proceed, unless I greatly mistake, that while there can be no doubt of the great increase of exhalation, if that be the correct phrase—it will be very difficult to prove, in any case, the fact of an obvious diminution of the power or action of the absorbents. Nay, we shall have repeated occasion to remark that both these functions go on coincidently with a rapidity and result far beyond what is natural.

There are few diseases, the nature and history of which are so much influenced by the causes which have produced them as dropsy, and these remote causes are exceedingly numerous and diversified.

Predisposition to it is said to be often hereditary, and dropsy may be regarded, therefore, as hereditary in this general sense. Van Swieten states, in his commentaries, on the authority of Plutarch, "that among the ancients, the children of those who died dropsical (or consumptive) sat with their feet immersed in water while the dead bodies were burnt, that the disease might not pass to them;" and from Van Helmont, "that in Antwerp, the vulgar thought the dropsy would descend to the next heir unless all the water was drawn off from the dead body."

This predisposition, however, does not necessarily consist, as maintained by Blackall, in feebleness or inactivity of the constitution. Dropsy, indeed, connects itself with the most opposite constitutional conditions, and some of its forms are much more frequently associated with hyperexcitement than with vascular debility.

A tendency to hydropic affections often arises from the influence of climate—and this influence may be exerted both directly and indirectly. Countries subject to cold and moisture, exhibit the first of these modes of predisposition. Hot and moist regions, on the other hand, give origin to malaria, which is not only a cause of dropsy, but produces many forms of disease of which it is a consequence.

Authors enumerate, among the causes of dropsy, general plethora, on the one hand, and, on the other, general debility, however induced, as by bad air, innutritious diet, great losses of blood, other inordinate evacuations. Cullen speaks of the preternatural abundance or undue proportion of watery fluid in the bloodvessels, as occasioned by drinking excessive quantities of water, particularly when cold, the cutaneous absorption of water from the atmosphere, and the interruption of the ordinary watery excretions, the sweat, urine, etc. The same author says it has followed a rupture of one of the lymphatics of the thoracic duct, of the lacteals, and erosion or rupture of the ureter, kidney, and urinary bladder.

It seems to be the direct effect of many diseases—scarlatina, most of all, gout and influenza; it succeeds many others, whether directly or indirectly, being occasionally associated with every variety of local organic lesion. This is true remarkably of derangements of the abdominal viscera, the liver, and spleen. Dr. Bright has drawn the attention of the profession to the frequent connection of dropsies with nephritic affections. Abortions give rise to dropsy, and so do the irritations of pregnancy and dentition. The abuse of many medicines is followed by the same consequences, whether immediately, or by their impressing certain local organic derangements; drastic cathartics, mercury, bark, iron, the vegetable acids, are all accused of this evil tendency. Intemperance in the use of ardent spirits, is one of the most prolific sources of dropsy in its worst forms. Whether this fatal habit be carried to the extreme of sottish debauchery and drunkenness, or limited to such indulgences as may be allowed without actual exposure and ruin to the reputation, the effect is ultimately the same; the vitality of the system is exhausted by the incessant application of inordinate stimuli; the powers of the stomach are worn out by the repetition of excesses, each more debilitating than the former, or its tissues thickened and inflamed by being so constantly bathed in a heating and almost caustic fluid; the chylopoietic viscera become universally obstructed and indurated, and disease and death must at length ensue.

Autopsy.—The morbid anatomy of dropsy is more interesting than instructive. Dissections of the dead can assist us very little in our investigations into the nature and pathology of functional diseases. In idiopathic general dropsy, the cavities of the body contain a thin serous fluid, which is extensively diffused throughout the cellular interstices. The very fibres of the muscles seem sodden in it. I have seen even the heart pale, flabby, and inelastic, as if soaked. It fills the subcutaneous cellular tissue—that which surrounds the muscular fasciculi, and that which is arranged about the tendons, joints, etc. The pressure of the fluid sometimes occasions the condensation or absorption of the viscera upon which it lies. In hydrocephalus, the brain is sometimes distended into a thin pulpy bag, by the filling of the ventricles; sometimes compressed or absorbed so as to appear a mere lump, by the weight of serous fluid effused on its outer surface. A similar compression of the lung may take place when there is much deposition within the thorax. It may also distend the loose cellular substance of this viscus—the anasarca pulmonum of Soemmering.

Symptomatic dropsy, as I have already said, is found connected with every variety of organic change in the affected viscera. None of these, therefore, can be regarded as definite or characteristic, although much has been urged in favor of thus considering the nephritic derangements. Yet these, also, are exceedingly varied and uncertain. The kidneys have been found wasted or atrophied, soft, hard, lobulated, tuberculated or scrofulous, scirrhous, granulated, presenting concretions sometimes, and sometimes hydatids, or vesicles resembling hydatids, both in their substance and on their surface. In old dropsical subjects, I have found the kidneys much diseased. They presented a confused structure, thickened and hardened. In several, hydatids had, as it were, burrowed in the external surface, from which they were readily drawn out when the membranous coat was peeled off. The ureters were greatly distended, capable, in one, of admitting the finger, and the pelvis of the organ dilated into a considerable sac.

The *diagnosis* of dropsy is not often uncertain, when general or universal. The early stages of some of its forms may be occasionally difficult to detect, or, indeed, may be almost inseparable from the varieties of local disease upon which they may be dependent. To determine with accuracy, however, whether a serous effusion is the mere result of some local affection, inflammatory or otherwise, or whether it is engrafted upon, and a portion of, the true hydropic diathesis—this is a question of much nicety, and bears very closely on the prognosis in any given case. It is also a matter of great importance in its influence upon our treatment, to know the nature of the modifications impressed, both by the varied conditions of the constitution, and the character of the cause which has produced the attack. It would be unreasonable to anticipate, from the almost infinite diversity of the causes of dropsy, of which we have given above a brief and imperfect enumeration, anything like uniformity of effect. A proper attention being paid to this obvious truth, we shall be enabled, in some measure, to reconcile the vast discrepancies to be found in the essays of practical authors, as well as to avoid the gross errors so often committed from inadvertence on the one hand, and the obstinate adherence, on the other, to exclusive views of the subject. Those who persist to regard dropsy as of course dependent upon direct debility, add fuel to fire, often, by the ill-timed employment of stimulants and tonics; while others, viewing it as essentially inflammatory, are no less apt to commit a dangerous mistake in depleting patients already sunk into vascular prostration. We must never neglect, then, this practical division of dropsies into entonic and atonic—the first, implying the remains, at least, of the ordinary vigor and elasticity of constitution, if not of some definite degree of morbid excitement; the latter denoting the opposite condition of notable debility.

We should next inquire into the probable connections of the hydropic effusions with organic lesions; the seat of such lesions, and their nature. In these inquiries, much stress has been laid upon the coagulability of the urine discharged by the patient. That the presence of coagulable urine is often associated with disease of the kidneys, is proved by Dr. Bright's cases; but this coincidence is by no means invariable. Prout regards it as indicating rather an irritative state of the system, while others deduce from it the inflammatory character of the disease. It is, indeed, often met with in acute cases, as they are called, invading rapidly as the result of some recently applied cause, as anasarca from scarlet fever.

The habits of the patient—the tendencies of the climate in which he lives—the history of the maladies by which he may have been affected, ought to be known, to enable us to understand fully his condition. In general dropsy, of which the abdominal effusion was the first to show itself, we shall seldom fail to trace the presence of hepatic disease, whether the result of exposure to malaria, or of intemperance in drinking. To the latter mode of causation, we must often, though surely not always, ascribe dropsies with early and prominent thoracic effusion; and here, too, the liver will be found scirrhous or tuberculated, or excavated with abscesses. I would be more apt to look for nephritic disorder or degeneration when anasarca preceded. In order to avoid the possible confusion between local, so called, and general dropsy, I apply the latter phrase specially to those instances in which the existence of the hydropic diathesis is shown by the concurrence of the three forms or localities of serous accumulation, namely, anasarca, ascites, and hydrothorax.

The general *prognosis* in dropsy is decidedly unfavorable. In the bills of mortality published in our country, it will always be found to occupy a conspicuous place, presenting annually an average number of victims, inferior to that of few other maladies. In frequency of occurrence, and in difficulty of cure, it is alike remarkable.

The special prognosis varies with all the diversities of condition and habit of the patient—the circumstances which have preceded the attack, and the nature of its probable cause. It is also influenced by the locality of the effused fluid, and by the importance of the organs whose lesion may have produced it, and with the proper performance of whose functions it may interfere, mechanically or otherwise, as in hydrothorax and hydrocephalus. Cases that have progressed to the full development of the three forms which go to constitute or denote what I have called general dropsy, are very rarely curable; perhaps they may be affirmed to exhibit a fatal tendency, with as few exceptions, as are to be found in any other variety of disease. While the effusion occupies but a single seat, on the other hand, we are permitted to entertain hopes of success proportioned to the chance of removing the cause. In entonic attacks, resulting from transient influences, as after the exanthemata, there is no very special difficulty of cure.

To the views given above of dropsy, generally considered, our *treatment* must of necessity correspond. In a disease confessedly so obscure in its nature, and liable to be produced and modified by such an indefinite variety of contingencies, we must avail ourselves of all attainable information concerning the constitution and previous life and habits of the patient, the diseases of which he has been the subject, and the medicines which he may have taken for their removal. If he is young and robust—if the attack has supervened rapidly after some exposure, or the application of some obvious cause—if the pulse be firm and strong, and, still more, if there be any tokens of inflammatory irritation in the part where the fluid is collecting, the morbid vascular excitement will require to be reduced by the usual antiphlogistic measures, among which the lancet certainly holds the chief place. To the same class of cases, the drastic purgatives and the sedative diuretics are well adapted; but surely there needs no caution against the indiscriminate employment of such efficient remedial means. A patient, whose languor and paleness told of protracted weakness and disease; whose pulse beat feebly, and whose failing powers were scarcely sufficient for the ordinary movements of animal life, would be compelled to resort to a regimen directly contrasted with the above. Stimulants and tonics are here absolutely necessary, in such forms and combinations as may be most promptly and effectually adapted to restore the impaired strength and exhausted vitality.

The unfortunate tendency of our profession to prescribe—and perhaps more peculiarly in this familiar case than in any other—rather for the name of the disease than for the actual condition of the patient, has done much evil by the misapplication of powerful medicines. The lancet, mercury, digitalis, and the most violent cathartics are in the hands of every one, and are widely used in the most indiscriminate and empirical manner. But these heroic remedies cannot be expected to be neutral or indifferent in their effects. If the sufferings of the sick be not relieved, they must be aggravated by them; their use must be followed, with little delay, by recovery or fatal prostration. "What can the reader conclude," exclaims Dr. Blackall, after reciting a lamentable diversity of opinions, of some of the most esteemed names of the profession, concerning one of the forms of dropsy—"What can the reader conclude, but that nothing is known of this disease, and that in its treatment the most powerful instruments are wielded in the dark?"

From the time of Sydenham, and even perhaps among the earliest of his predecessors, the attention of the physician has been almost exclusively directed to the mere evacuation of the effused fluid. To accomplish this purpose seemed the whole of his task; the means for effecting it were the grand desideratum. These assumptions were, indeed, natural and obvious, and it was scarcely less so to look to the kidneys as the proper outlet for all such accumulations. The scantiness of the urine, in a great majority of cases, could not escape observation, especially as the patient, tormented by an unquenchable thirst, is apt to indulge in large and frequent draughts of water. Hence arose, and plausibly enough, the notion, even now prevalent, of a direct connection between the deficiency of this excretion and the collection of watery fluid in the several cavities. Strength was added to this opinion by the physiological experiments, which went to show that the kidneys gave passage out of the body to almost all the extraneous matters which in any way find admission into it, whether by digestion or simple absorption. Diuretics have hence, for a long while, borne the palm among the remedies for dropsy: a preference which would undoubtedly be well deserved, if the evacuation of the effused fluids were indeed all that we have to desire. The Materia Medica abounds in direct and indirect diuretics, of such powerful efficacy and of such diversified influence, that we may venture, in every case, to indulge strong hopes of succeeding thus far in the effort to succor our patient. But, unfortunately, this is not all. I have already alluded to the alternation which is occasionally to be noticed in the excitement of the absorbents and of the excretories during the continuance of dropsy, numerous instances being on record in which there was a rapid disappearance of all the watery swellings, either spontaneously or as the effect of medicines, followed but too often by as rapid a reaccumulation. Nay, it is perhaps in the worst cases and in the lowest and most debilitated states of the system, that we shall find it most easy to get rid of the serous effusions at such intervals; but this, so far from curing the patient, is scarcely, to speak with pathological correctness, taking a single step towards his cure. To prevent the return of the hydropic intumescence, to remove the tendency to the reaccumulation of fluid, to relieve the constitution from that state of which this tendency is a part—in other words, to do away with the dropsical diathesis, and to restore the organs diseased in whatever manner, infiltrated and oppressed, to their previous condition; these are the problems before us of difficult solution; these are the indications which must be carried out, in order to the recovery of the patient and the resumption of health.

Our plans for the accomplishment of these objects are all vitiated by our ignorance of the nature of the disease, and our embarrassment under the infinite diversity of contingencies presented in its history. Similar effects seem to arise not only from dissimilar, but from apparently opposite causes; and the effusion which in one subject we attribute to inflammatory violence of vascular action, and endeavor to remove by the most unsparing depletion, in another we ascribe to relaxation and debility, and aim at relief by the diligent use of tonics and stimulants.

The diuretic method of treatment, aided occasionally by the use of hydragogue cathartics, which, by their mode of action on the bowels, give vent also to large serous evacuations, is still the most generally received, and, notwithstanding its undeniable want of gratifying success, and the great comparative mortality of dropsy everywhere, and in all its various forms, is still confided in, and almost exclusively resorted to by a very extensive class of physicians.

I deny, most unequivocally, that diuretics possess, as so many maintain, any direct or specific power to cure dropsy. It is true, indeed, that the diminution of the watery swellings is sometimes apparently proportioned to the increased discharge of urine; but this concurrence does not prove that they stand in the relation of cause and effect to each other; I rather believe them to be coincident effects of a common cause. Besides, if a diabetes could be thus substituted for the previous hydropic accumulations (as has been imagined by Blackall to be sometimes the case), if the serous effusions could be turned off by the kidneys as fast as they are poured out by the diseased exhalants, what would our patient gain? Nothing. His emaciation and general debility would go on just as before, nay, he would probably sink more rapidly under diabetes than dropsy. What would be said of a cure of ascites, which consisted in offering, by a canula kept in the belly after the operation of tapping, an uninterrupted outlet for the serous effusion, thus prevented from accumulating?

It is a fact which should be kept steadily in view throughout all our discussions on this subject, that all remedies which tend to bring back the system to a healthy and natural state act in dropsy as diuretics. Those which reduce action when too high, and those which stimulate when it is defective; those which affect favorably the general constitution, and those which address themselves to particular organs whose functions are impaired, operate in a like manner.

Mercury is often our best diuretic. Emetics sometimes produce large urinary discharges; so do cathartics. Bark and Port wine have been employed with the same effect. A case is related by Professor Graham, in which, he says, "it was curious to observe how fully the kidneys did their duty, after depletion, without the exhibition of diuretics. When the patient first came into the hospital, the urine was a mere nothing; after the second bleeding, it arose to eight ounces, and in the twenty-four hours preceding the third bleeding he passed two pints (32 oz.) of water; on the day after the third bleeding, it was two and a half pints (40 oz.); and previous to the great bleeding—seventy ounces of blood!—it was three and a half pints (56 oz.). After that bleeding, it soon got to eleven pints per diem (176 oz.)."

I must not be understood to question the propriety of employing diuretics in dropsy; this would, indeed, be an absurd and ridiculous speculation. I propose to regard them in the proper light of highly useful auxiliaries, not of remedies demanding our chief or exclusive reliance. It is to be recollected, too, that many of that class possess well known medicinal powers independent of, and apart from, their effect on the urinary excretion, as digitalis, colchicum, cantharides, squill, nitrous ether, and the nitrate and tartrate of potass. A skilful and conscientious physician will never neglect any means of cure that may be in his hands.

ANASARCA (*Cellular Dropsy*).—I proceed to treat successively of the various forms of dropsy, and first of Anasarca—*Hydrops Cellularis—Dropsy of the Cellular Tissue.* This distensible tissue is very liable to serous infiltration from a great diversity of causes. Its partial occurrence is known under the title of œdema, and is familiarly met with in local injuries of the limbs and joints, as after sprains and dislocations; in circumscribed inflammations, erysipelatous, phlegmonous, &c., and as arising from vascular debility. Thus in old age, and in sedentary habits, a swelling of the feet and ankles is often observed to take place in the evening, which, favored by the recumbent posture, may disappear before morning, whether by diffusion or absorption. It also offers itself to our notice among the latter symptoms of many protracted maladies—phthisis, for example, jaundice, asthma, diarrhœa, especially in children, marasmus, &c. Ascites and hydrothorax hardly ever exist long without the supervention of anasarca, but for whatever reason, it seems most readily and certainly to connect itself with the latter. With hydrocephalus it does not exhibit any striking tendency to concur, unless in long protracted cases. A metastatic relation has been found to exist between them in a few instances, as I shall by and by state.

It is so frequent an attendant upon some of the exanthemata, that it is proposed to denote it, under such circumstances, by a special phrase, as Consecutive Anasarca. Scarlatina is very apt thus to produce it; it also follows smallpox, measles, urticaria, and erysipelas. It is supposed often to depend upon functional disease of the kidney or structural lesion of this organ.

With the exception of these consecutive cases, which do not seem to be much influenced by the previous condition of the patient, but rather belong to the train of events comprised in the history of the febrile attack, or the local cutaneous inflammation and its consequence, anasarca seems to me most frequently connected with, if not absolutely dependent on, a feeble and atonic state of the constitution.

In a great majority of instances, I am persuaded that the morbid effusion within the tissue, is rather the result of a passive transudation from general vascular inaction, than of a mere increase of the natural exhalant function. Indeed, as I have already said, there is no proof of any serous exhalation in the healthy condition of this tissue. I do not deny the possibility of entonic or even febrile anasarca; but this modification is rare within my own experience.

In ordinary cases of cellular dropsy, the swelling first appears on the lower extremities; the areolæ of the subcutaneous membrane communicating freely, there is nothing to prevent the fluid from obeying the common law of gravity. The skin distends uniformly and gradually; is pale and rather colder than natural; the swelling is inelastic, though pretty firm; when pressure is made with the finger, pits are formed, which slowly disappear. The distension becomes more and more general, affecting at last the trunk and face, until the peculiarities of countenance are in a certain degree lost, and in extreme cases the features bloated and confused into a doughy mass. In certain parts of the body whose structure is lax and dilatable, the intumescence becomes monstrous, as in the penis and scrotum. It is not only in the subcutaneous cellular membrane that the effusion takes place; it is said to occur, within the same tissue, whether interposed between muscles, forming the sheaths of the vessels and of tendons, or surrounding joints, or elsewhere disposed. To such an œdematous condition of the lungs—a state, indeed, to which the term anasarca pulmonum has been applied—would I ascribe the dyspnœa so often attendant on ordinary cellular dropsy, and productive of so much additional distress to the patient.

It must not be imagined that this deposition of serous fluid, with its very great mechanical inconveniences constitutes the whole history of the disease under consideration. Far from it. Coincident with the appearance of dropsical swelling, and in many instances previous to any notable distension, the general health of the patient is obviously impaired. He complains of languor and incapacity—both bodily and mental—and undergoes great fatigue, with frequent faintness from slight muscular exertion.

Hence he becomes indolent, unwilling to move, drowsy, and vertiginous. There is gastric uneasiness, with loss of appetite, and in many instances occasional vomiting of foul porraceous matter, or an offensive mucus. The tongue is pale and sodden, coated with a whitish fur. The skin is dry and harsh generally, though in some it is relaxed and moist. The thirst is usually tormenting. The bowels are for the most part torpid, and the dejections little changed. The urine is scanty and high colored, especially when there is present any febrile irritation. The pulse varies much, being usually frequent, quick and soft. In acute and entonic cases, it may be met with tense, hard and abrupt. Such is the condition of the patient in exanthematous anasarca, in certain instances. Here the tongue is red, the thirst great, there is dyspnœa, the urine is scanty and albuminous, the effusion increases rapidly, and the distension is apt to be promptly attended with cutaneous inflammation in depending parts.

When anasarca goes on unrelieved, the patient sinks at last under the exhausting oppression of the organs with whose functions the effusion interferes, either by infiltration into the cellular tissue which forms a portion of them all, or by its exhalation into the serous cavities, thus developing general dropsy, or under the ceaseless irritation arising from the distension of the skin, which cracks, vesicates and ulcerates in a loathsome and distressing manner.

The *prognosis* in anasarca is unfavorable. In cases of the consecutive character, it is less so than in the other forms. In fact, it may be doubted whether these cases are (at least in the early stages) identical in their pathology, or proximate cause, with true anasarca dependent upon the hydropic diathesis. They seem to me to be in a certain sense merely local, as being the result of a temporary impairment of the function of the cutaneous integument from recent and previous inflammation. Besides, such attacks present, very generally, an entonic condition of the system, and occur—a large majority—in early life, when the recuperative powers of the constitution are vigorous and elastic.

There is a variety of anasarca, not very rare, perhaps, in which I would venture upon a prognosis generally favorable. It seems to arise from disorders in diet, conjointly with neglect of proper ablution of the skin, and change of clothing; and is chiefly, if not exclusively, met with in our black population.

The *causes* of anasarca are not very definitely made out, or rather so many have been enumerated by authors that we have lost sight of their relation with their alleged effects. A majority of them have been already mentioned incidentally. Besides these, exposure to damp and cold air, pulmonary affections, perhaps from their interfering with the watery exhalations from the respiratory surfaces, diseases of the kidneys, inordinate evacuations, such as large losses of blood in the treatment of disease, by accident, or by hemorrhages, especially in the states of pregnancy and parturition, leucorrhœa, serous diarrhœa, especially in children, and worms, may be briefly specified.

The *treatment* of anasarca will, of course, require to be modified by the various contingencies alluded to, as forming such prominent parts of the history of the several cases. The apparent cause, the permanent constitutional peculiarities of the patient, his habits of life, his recent history as to exposures, attacks of disease, and remedies employed for their removal, must all be taken into due consideration. In entonic anasarca we resort to antiphlogistic measures. The lancet may be occasionally of service, though this kind of depletion has been badly borne by anasarcous patients under my care, even in the cases apparently best adapted. While, therefore, I do not absolutely forbid bloodletting, I must advise great caution in resorting to it.

Equal advantage, with far greater safety, may be obtained from the class of cathartics, among which some selection is necessary. The hydragogues, so called from the fact that they not only effect the evacuation of the contents of the bowels, and stimulate the collatitious viscera, but by their peculiar influence upon the exhalant vessels, opening upon their internal surface, solicit from them large thin and watery discharges, have been, on this account, regarded as peculiarly suited to the present case. There are many of these. The most confided in are elaterium, scammony, colocynth, gamboge, jalap, the seeds and oil of the croton tiglium, or bastard ricinus, several of the neutral salts, especially the sulphates of soda and magnesia, and the supertartrate of potass. The first of these, elaterium, requires to be employed in small doses; scammony and colocynth are not only exhausting, but produce much intestinal irritation, if not well guarded. Gamboge and jalap are nauseating, and by depressing the digestive powers tend much to exhaust the strength of the patient. I have seen more than one patient, as I fully believe, literally purged to death by the use of these harsh drastics, and, therefore, again urge the necessity of attentive caution. Gamboge seems to me the safest of them, in small quantities, and in judicious combination, best with the spts. nit. dulc., for it is so apt to become emetic if offered in too large amount, that its debilitating influence as an evacuant is thus often prevented.

For the most part, we shall gain as much, with far less risk, by the exhibition of the neutral salts. Solutions of the sulph. magnes. or the sulph. sodæ, may be combined with such other remedies as are thought proper to be given. But the cream of tartar—the supertartrate of potass—is the article most commonly administered, and most universally confided in. To insure its cathartic effect, it should be mingled with some of the resinous purgatives. Jalap is usually selected, and though this formula deserves the high recommendations so universally accorded to it when well suited to the condition of a patient, yet, in debilitated subjects, the reduction of the general strength and vital power may go on quite as rapidly as the diminution of the dropsical swelling, expected to be consequent upon the large discharges of watery fluid from the intestines.

The croton tiglium is, by many, asserted to be freer from the risk of inducing prostration of strength than any other of the class of hydragogue cathartics. It possesses the advantage of concentration, the dose being so small as to be easily taken. Indeed, it is affirmed that if the oil be applied endermically, it will often give rise to abundant alvine evacuations, a few drops having been well rubbed in over the surface of the abdomen.

Emetics, which formerly enjoyed an almost unlimited reputation for the cure of dropsies, have, of late, fallen into unmerited disregard. While the theory prevailed, which ascribed the serous collection to a deficient action of the absorbents merely, they were much relied on as being strongly efficient in exciting absorption. But it is not in this way that I account for their usefulness. I have already mentioned the tokens so frequently to be met with of a depraved state of the digestive organs in dropsy, the foul tongue, the oppressed and nauseated stomach, the constipation, etc. These symptoms are often promptly removed by an active emetic, an antimonial, especially, which not only relieves the gastric disorder present, but, by the concussion given to the whole of the abdominal viscera, disgorges them, promoting a free circulation of blood through their vessels, thus carrying off such obstruction as may be present, and communicating a beneficial excitement to the whole vascular system. Dirt eating among our blacks is connected with a species of cachexy on which anasarca is an almost constant attendant. In such instances, the repeated use of emetics is our very best method of treatment, if, indeed, it be not indispensably necessary to a cure. They bring away immense quantities of a vitiated mucus from the depraved stomach, and thus promote, in the promptest way, the restoration of the lost tone of the organ, and the substitution of a natural appetite for the morbid and brutal desires now become habitual.

Diaphoretics are particularly, though by no means exclusively adapted to dropsies of febrile character. Their good effects are to be attributed to their general action upon the circulatory system, by diffusing vascular excitement where there are morbid determinations to, and engorgement of particular viscera, and by directing it to the skin, and promoting cuticular transpiration, almost always deficient. It is in this way that the hot and vapor baths do good service. Even cold water, made in any way stimulating, as by the addition of various salts, is often useful, and sea bathing has been much recommended.

The several snakeroots, as they are vulgarly called, the seneka serpentaria, and the button snakeroot, the eryngia yuccifolium, are held in deserved repute. The infusions of the two former are, with great advantage, made the basis of cathartic solutions of Epsom and Glauber's salts. These mixtures act upon all the excretions, affecting the kidney as well as the skin and bowels; and form some of our best prescriptions in anasarca.

Antimonials may often be also so managed as to produce this general excitement of the emunctories, and should be employed in cases

cated with febrile irritation. They may be combined, on the
nd, with mercurials, in small doses, or with the nitrate of potass,
strength of the patient be still good, and the circulation vigorous.
the other and, there is a disturbed state of the stomach, or the
ls are irritable, we may unite them with opium. This last article,
mbination with another of the diaphoretics and emetics—ipecacu-
—namely, is often of great use. Dover's powder, indeed, is one
r best diaphoretic formulæ, and may be very extensively adminis-

n alone, is frequently prescribed with great advantage. Mead
each relate a case cured by it. Heberden, in his commen-
says that he "has known anasarca sometimes cured by opiates,
at night; probably, he thinks, by the sweating they occasioned."
speaks of their hed, and proposes as a ques-
e opiati ur laugent et morbum sæpe tol-
reply to which is ren upon the principles I have
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, for example, that he has diuretic action of both squills
gitalis greatly assisted by
much stress has been laid exhibition and due management of diuretics in the treatment of dropsy, and they have been esteemed of such special importance, and, indeed, essential necessity, that the treatises of the disease have frequently been little more than encomiums upon this class of medicines, recommendations of particular articles among them, and discussions as to the best modes and circumstances of their administration. They have been regarded as bearing the same relation to the hydropic diathesis which cinchona bears to intermittent fever—not merely as evacuants, but as antidotes. I signified above my dissent from these views; but while I deny to diuretics, simply considered as such, any specific adaptation to the present case, I am ready to acknowledge that they are often, by their general influence and indirect operation, besides their evacuant powers, of decided and obvious benefit.

That there exists, in dropsy, a peculiar morbid condition of the exhalant vessels and surfaces, will scarcely be questioned; it will also be allowed that this morbid condition is liable to be modified by whatever modifications of cause and of individual constitution. There is no more uniform symptom of the disease than a general deficiency of the various secretions and excretions; this deficiency, whether dependent on the cause which has produced the morbid effusion, or resulting from the effusion itself, tends to increase it, or admit of its increase. On the other hand, the restoration of these several secretions and excretions, by deriving fluids from the morbidly congested surfaces and exhalant vessels, will act revulsively, and prove efficient, 1st. In preventing any further increase of effusion; and 2d, by affording a ready outlet for such amount of the deposited fluid as the absorbents of the affected surface may take up. And there is, as I have before said, no proof of the torpor so commonly attributed to the absorbents in dropsy. At any rate, there cannot be a doubt that they often give token of increased, rather than diminished energy. Evidence of this is readily found in the rapid disappearance, so often witnessed, of dropsical swellings, followed too often by as rapid a recurrence of them. The vessels being distended and oppressed by the quantity of watery fluid carried into the circulation by the activity of the absorbents, unload themselves qua data porta, not by the kidneys only, the readiest and most natural outlet, I grant, but in any other feasible mode; by the intestines, as when hydragogue cathartics are prescribed; and, as I have quoted from Sydenham, under the action of antimonials; and as I shall state, on the authority of Chapman and Caldwell, in a most extraordinary manner, through the cutaneous vessels.

Willan, in his miscellaneous works, relates a singular case, strongly in point. He was called to see "a woman of about thirty-eight years of age who was anasarcous; she was universally bloated, her legs, especially, being swollen to an enormous size, and there seemed to be fluctuation in the abdomen. After the natural cessation of the menstrual discharge, there came on suddenly a flow of water, which drained through the bed before she could get assistance, and afterwards filled a vessel which held three quarts, leaving her faint and languid. This evacuation continued in a more gradual manner, for two days, when the dropsical effusions had entirely disappeared; within ten days, the water had again accumulated, and again the same evacuation took place, and with the same effect; she now went into the country, took cinchona, and completely recovered." Dr. Willan believed, and with much apparent reason, that the discharge here was from the uterine vessels. It is impossible to account for, and difficult to conceive of the prodigious rapidity with which, in instances like these, the absorbents, under some inexplicable influence, act upon collections of fluid, to whose presence they have been previously indifferent.

But, further. The diuretics, so called, do not seem more likely to occasion the proper excretion of urine, in dropsical cases, than any other remedies. When they have arisen from visceral obstructions, calomel alone will occasion free discharges by the kidneys; cinchona alone will succeed similarly when debility is the prominent condition. Opium, under some contingencies, tobacco under others, act in the same way.

A still more striking instance, perhaps, of this indirect diuretic operation of well adapted curative measures, is given us, on the authority of Mr. Johnson, Surgeon of the Asia East Indiaman: "On the arrival of this ship off Canton, the sailors were attacked with dropsy, attributed to the use of damaged rice, upon which they had been obliged to subsist towards the conclusion of the long voyage. They were placed, when in port, on a diet of well fermented bread, which operated as a very active diuretic, within twenty-four hours after they had begun its use." "No doubt," he says, "remained in the mind of any one what it was that had performed the cure."

The first article, which I speak of under the head of Diuretics, is cold water. Water is not only one of the most certain and powerful diuretics, but it is scarcely possible to obtain the favorable action of any medicine whatever, upon the kidneys, without allowing free dilution.

It is proposed to add to the efficacy of water, as a diuretic, by infusing in it a very great number of vegetables—some of them in common use at our tables. Of these, the garden parsley is, I think, the most to be depended on—the horseradish, the garden and watercress, are also serviceable. The green broom and juniper-berry, should be mentioned; the latter is familiarly employed in the Dutch spirit, to which it gives flavor. The root of the artichoke, squill, colchicum, tobacco, and digitalis, are most generally trusted to in regular practice. All these I find uncertain in their effects; tobacco, perhaps, least so of them all; eulogized by Fowler, it has also been recommended by Dr. Ramsay, in his *Medical History of South Carolina*, as of great benefit in the treatment of dropsies occurring among negroes especially, during the revolutionary war. Some preference seems to be due to a tincture, prepared from the leaves of the plant rendered crisp, by drying quickly over a fire. The dose seems to be limited chiefly by the ability of the stomach to retain it, or of the patient to bear the oppressive nausea it produces. It is used in substance, powdered—a tincture of the leaf as ordinarily dried, and even the ashes of the plant. Of the tincture of the leaf dried as above directed, we may begin with the dose of 10 drops, twice or thrice a day; and increase until we obtain its effect.

Colchicum is often of great service. I should be disposed to place particular reliance upon it in cases marked by any tokens of nephritic disorder, or where there had been any previous gouty affection.

The squill is seldom given alone, although many respectable physicians still retain the once-prevailing good opinion of it. As expectorant, it is often applied to when there is much dyspnœa or pulmonary oppression. Perhaps it has lost some of its reputation by being administered in ineffective doses. The infusion, in as large quantity as can be borne, seems to offer the best prospect of obtaining its good effect. It is, perhaps, most employed in substance and in combination, especially with calomel and some diuretic salt, as the nit. of potass. It is unsafe to persist long in its exhibition. I regard it as peculiarly injurious to the digestive powers. "The debility and loss of appetite that result from it," says Blackall, who nevertheless made much use of it, "are often rapid and excessive."

Of digitalis, which is by many regarded as the principal diuretic and chief remedy in dropsies, of whatever character, I would remark that with the exception of the recent experiments of Dr. W. A. Hammond, U. S. A., of which I readily admit the force, I know of no proof of its being of itself, and intrinsically, a diuretic at all. It is a powerful narcotic; it diminishes the force, and in a very striking degree, the frequency of the pulse; it disturbs, in various ways, the sensorial and nervous system, over some of the modes of whose excitement and irritation, it seems to exert a singular control; it nauseates, and acts as emetic. Its indirect operation upon the kidneys, in dropsical cases, may be understood upon the principles I have laid down, without ascribing to it any immediate diuretic properties. I have never seen it exhibit any such, in diseases unattended with serous effusion. I am in the habit of employing it daily, in pulmonary disorders. I prescribe it in many nervous affections. I have administered it in every varied manner, and in every quantity consistent with the life of the subject. I have seen a patient kept under its poisonous influence for nearly a week, with a pulse about forty—a dilated pupil, a stomach miserably oppressed and nauseated, and great annoyance from hiccup. In cerebral affections of the irritative character, such as mania a potu, somnambulism, and the like, I do not hesitate to give ʒii or ʒiii, at a dose, or an ounce of the sat. tinct. in twelve hours. Yet in no instance have I met with diuresis as a consequence of its exhibition, in any quantity or formula, unless, as I said above, when hydropic accumulation existed.

"If any person," observes Ferriar, "were inclined to write a satire on medical evidence, the different testimonials respecting the properties of this single plant, would furnish abundant materials. 'It is a diuretic,' says one physician. 'It has no diuretic powers,' says another. 'It is a stimulant,' says a third. 'It is a sedative,' cries a fourth. 'It has no properties at all,' exclaims a fifth."

Digitalis is supposed to be peculiarly susceptible of having its effect on the system modified by combination with other remedies, and hence was derived the recommendation echoed by so many, from Paris down, that it should always be administered alone. The rule is unquestionably a good one, yet it admits of occasional exceptions. When there is hepatic or other visceral obstruction, calomel may be added with much advantage, nay, I have seen combinations with some of the cathartics attended with immediate effect upon the kidneys, as soon as the bowels had been freely opened.

Dr. Withering has advocated the opinion, which, indeed, receives the general assent of physicians, that this narcotic acts most favorably in the dropsies of low, feeble, and lax constitutions, where the complexion is pale, the pulse weak and small, and the solids flabby. Darwin maintains that it is peculiarly adapted to the cases of old drunkards, and debauchees. It seems to be far less useful (if at all) in entonic dropsy, connected with vascular excitement or febrile irritation, when the pulse is chorded, the strength good, the tongue red, and the skin hot and dry.

Beyond the inferences drawn from these remarks, no positive rules can be given for its administration. I am inclined to think that the medicine often fails to produce its good effect in dropsy, from being administered in too small doses, and that it does harm in the hands of some physicians, from being persisted in too long. Every one has noticed the accumulative influence of certain medicaments, of which we have in digitalis a striking example. To obtain its beneficial action as a diuretic, it demands to be given in as large quantity as the stomach and nervous system will bear—the infusion being the preferable mode, and next to it the powder of the leaf. It does not require any great length of time to act upon the kidneys, and therefore, I would discontinue its use, if after a few days—from seven to ten—there is not an obvious increase of the urine discharged. Afterwards it may be offered again, and by such intermission we avoid all evil results.

In the more atonic or asthenic attacks of anasarca, it would, perhaps, be better to substitute for the narcotics and nauseants, of which we have been treating, the more stimulating diuretics. Serpentaria and seneka are much used, and the latter will often be found very serviceable, especially if combined in substance with the nitrate of potass, or in infusion with nitrous ether. The eryngium yuccifolium, known to the common people as the button snakeroot, is in high repute here, and I have seen its exhibition attended with signal good effects. Cantharides, both in powder and tincture, have been employed with advantage. When there is nothing in the condition of the stomach or general system to contraindicate so impressive a stimulant, it well deserves a trial.

Among the saline diuretics there are also found many articles of considerable value in the treatment of dropsy. They are, it should be observed, better adapted to the management of the disease in its acute and subacute, sthenic, or entonic forms. Among them we may enumerate the carb. sodæ, the carb., subcarb., and acetate of potass., the latter of which, indeed, is called, by way of distinction, in the old books, sal diureticum. I think the nitrate quite equal to it in power; so are, according to Dr. Heberden, the "soluble tartar," tartrate of potass, and the Rochelle salts, tart. potass. et sodæ. Of all saline diuretics, however, that which is looked to with most confidence, and spoken of with most unqualified eulogy, is the super-tartrate of potass—the cremor tartari. I cannot help admitting the claim preferred for it by both Home and Ferriar, of being the most certain of all diuretics. Yet I by no means concur in the general opinion of its peculiar harmlessness and safety. On the contrary, I believe that no patient can continue to take it for any great length of time without injury, unless in a condition of obstinately high febrile excitement; a state of the system which seems to resist its evil influences. In asthenic subjects, and atonic cases, it ought to be abstained from, or used rarely, as a hydragogue cathartic only. When persisted in too long, it has been known to bring on a total loss of the tone of the stomach, with sudden and irremediable prostration.

A very important portion of the treatment of anasarca, will often be found to consist in the proper management of tonic remedies. Of these, the principal, doubtless, is exercise, which is affirmed by Cullen to be of itself sufficient, sometimes, to remove or cure the disease in its early stages. There is, however, as has long been matter of familiar observation, a peculiar languor, heaviness, and somnolency attendant on dropsy, with great indisposition to any species of muscular effort. It is necessary, therefore, to entice the patient to such exertion, or to institute peremptory rules for his government. An agreeable journey may be proposed, a visit to different places of fashionable resort, riding and sailing parties, and some of the athletic sports, under shelter, provided for inclement weather. Of all these modes of exercise, however, those are to be preferred which imply most muscular action with greatest circulatory excitement. Every one must have noticed the disappearance of œdematous swellings of the lower limbs after a brisk walk. The restoration of the functions of the cutaneous vessels will be much aided by frictions on the surface, which should be stimulated twice or three times a day, by the smart application of the flesh brush.

The cold bath has been proposed with the same view, and will be productive of obvious benefit, provided there be still sufficient elasticity in the cutaneous vessels to exhibit a ruddy, warm glow immediately. This is both the mode and the test of its utility. If the patient be chilled by it, we must not repeat it. Under the idea, founded on well known physiological facts, that dropsical swellings were increased by cuticular absorption of moisture from the atmosphere, the use of the tan bath, the infusion of oak bark, has been employed, and, it is asserted, with decided advantage, as an astringent tonic. Flannel should, of course, be always worn next the skin.

Of the mineral tonics, iron has been generally preferred. The Italian physicians, regarding it as a contra-stimulant, however, consider it best adapted to the acute or entonic forms of dropsy. They administer the sulphate of iron in such cases, in almost incredible quantities. Beginning with a few grains, they increase the dose to ʒi or ʒii, twice or thrice a day. Instead of augmenting the febrile symptoms, they assert that it lowers the pulse, increases the urinary discharge, and all the other secretions and excretions, thus removing the dropsy and improving the constitution at the same time.

Among the vegetable tonics, cinchona is unquestionably the best. A form of anasarca often occurring in our black population, has been mentioned, and ascribed to causes which tend concurrently to depress the general vitality of the system, and injure the powers of the digestive organs. This I have found best managed from the beginning by the use of cinchona in free doses, the bowels being kept open by the addition, when necessary, of proper quantities of rhubarb or jalap. Blackall relates several instances in which the morbid appearances of the urine were completely changed by a course of cinchona, and the disease speedily removed. When the bark offends the stomach, it will be well to combine with it some aromatic, camphor, ginger, and the like.

Cullen's commendation of bitters has been already quoted. It will occasionally be found of advantage to mingle the gentian, colombo, etc., with a hydragogue cathartic, or with the diuretics which we are exhibiting. Good porter or ale may be employed as a beverage, or made the vehicle of our diaphoretics. Nitrate of potash is used in this way, dissolved in brown stout. Our vegetable diuretics are also steeped in gin, which is itself diuretic, as being flavored with juniper.

The distension of the skin is the source of intolerable inconvenience to the anasarcous patient; and if timely relief be not afforded, will produce inflammation, vesication, foul ulcers, and even gangrene. I see no reason to hesitate as to the propriety of scarifications. If these be made slightly, with a clean, sharp lancet, there is little danger of the ill consequence upon which some writers have laid such stress, but which I have never met with. The skin of the instep, and around the ankles, is most swollen, and the punctures should be made there. The penis and scrotum will sometimes require this relief.

These little wounds, if inflicted in the morning, will give vent during the day to much water, and the skin having thus become relaxed, they will heal during the night, favored by the recumbent posture.

It is astonishing what quantities of fluid will escape at those orifices, not only with great relief to the local sufferings of the patient, but often with decided general advantage. Blackall found the qualities of the urinary discharges perceptibly improved by it, and the quantity of the excretion is sometimes augmented.

Acupuncture has been substituted by some timid physicians for scarification with the common lancet, and no doubt answers the same purpose very well.

For the prevention or cure of the inflammation and ulceration which sometimes follow the cutaneous swelling, it will be proper to apply the gentle restraint of an equable elastic bandage. We thus give the requisite support to the integuments of the lower extremities, which must not be allowed to remain in a dependent position. Foul or gangrenous ulcers must be washed with some spirituous or stimulating lotion, and protected by the application of soft poultices. Charcoal, yeast, or the chlorates, may be used to correct the offensiveness of the discharges.

The diet should be always nourishing. If the patient be in an asthenic condition, stimulating food and drinks may be offered. Certain condiments are supposed to be useful, as onions, garlic, horseradish, etc. Similar properties are also ascribed to particular drinks, as cider, spruce beer, and good Hollands.

ASCITES (*Abdominal Dropsy*).—Ascites consists in a collection of serous fluid within the cavity of the peritoneum, whence it might be called with propriety, peritoneal dropsy. We should thus distinguish it from the encysted watery tumors, as of the ovaria, etc., which are occasionally met with in the abdomen, as well as the rare disease, hydrometra, or watery distension of the uterus. These local affections should never be confounded with dropsy, from which they differ essentially in nature, cause, history, and treatment, and, so far as I am aware, are entirely unconnected with the hydropic diathesis.

A gradually increasing swelling of the belly, attended with a sense of weight and fulness, and, for the most part, with obvious fluctuation, marks the presence of ascites. The distension is at first painless, perceptible only in the erect posture, and most, when leaning slightly forward; disappearing when the patient lies on his back. Either previous to, or soon after, this symptom is noticed, the general health will be found to be much disordered. There is languor, with inactivity and drowsiness; yet the sleep is not sound, and is apt to be disturbed with nightmare or dyspnœa. The appetite is lost; perhaps nausea occurs in the morning; the bowels are usually costive, the urine scanty and high-colored, the skin dry and harsh. In the more asthenic attacks, the surface is cold and pale; but it is most frequently the fact, that there supervenes a degree of irritative fever, more perceptible in the evenings, with a quick and corded, though small pulse. The tongue is coated with fur, though sharp at the point, and darkly red at the sides. The muscular strength is impaired; respiration becomes impeded by the pressure of the accumulating fluid upward against the diaphragm; after a time, anasarca comes on, and often hydrothorax also, and the patient sinks, worn out by a train of sufferings which it is painful indeed to witness, and impossible to describe, in all the varied modes of infliction.

The *causes* of ascites are, speaking of a large majority of instances, more obvious than those of the other forms of dropsy. It is seldom idiopathic, as meaning primary, and as contradistinguished from the consecutive, but is truly so in the pathological sense, as indicative of a peculiar state of constitution or diathesis. It is connected, in different individuals, with all forms of local visceral organic disease, none of which, therefore, belong to its essential or characteristic history. The peritoneum, from whose wide internal surface the effusion takes place, is spread over a great number of viscera whose functions are diverse—whose structure varies greatly, and whose disorders are very different. Yet ascites has been found associated with all the modifications of disease which affect every one of these organs.

In our malarious regions, it is often attendant upon hepatic inflammations and obstructions; it follows jaundice; it results as a consequence of protracted intermittents, either from the direct effect of these fevers upon the system, or indirectly from the enlargement of the spleen, so often observed to occur. Many examples have been collected of its apparent dependence upon nephritic affections. It supervenes upon chronic peritonitis, dysentery, and diarrhœa; in children, often follows scrofulous disease of the intestines and mesenteric glands. It is not unfrequently ascribed to interruptions of the menstrual secretion in women, from whatever source, and is produced by the mechanical irritations and obstructions of the pregnant state; large losses of blood give rise to it, whether accidental or spontaneous, and in this way I would account for its occurrence after parturition. It is one of the most frequent results of intemperance. It comes on promptly after the repulsion of cutaneous eruptions, and constitutes part of the train of evils in the history of the exanthemata. It sometimes invades rapidly, being attributed to the influence of cold and moisture conjoined, and to the excessive ingestion of cold fluids, especially if the body be previously heated and fatigued. It is produced sometimes by an obscure chronic peritonitis.

Professor Chapman, of Philadelphia, affirms, that he has seen flatulent colic succeeded rapidly by dropsical effusions within the belly. He supposes that, in such instances, the exhalants of the peritoneal surface give out large amounts of a gaseous secretion, which promptly condenses into the serous fluid of ascites. A striking example of this sort occurred under my own care. A patient, laboring under dysentery, was suddenly distended with air, a true tympanitis, which subsided into dropsy within twenty-four hours; serous effusion following pneumatosis.

Diagnosis.—It is of importance to distinguish ascites from the state of pregnancy in women; from tympanitis; from the encysted dropsies or serous tumors within the body, and from the physconiæ, under which term are comprised the enlargements of the several viscera contained in the abdomen. These visceral enlargements are irregular in form, occupying one side or the other, usually movable, hard, and inelastic. Tympanitis is tense, but light, and returns upon percussion the peculiar sound from which its name is derived.

In peritoneal dropsy, we attend to the subsiding of the prominent belly when the patient lies down; the fact that it has increased equably, and from below, upwards. These symptoms will separate it from encysted dropsies, so called; besides, that the latter show rarely, and by mere accidental coincidence, any connection with the general deterioration of health, which belongs to the history of ascites.

Fluctuation of the fluid in the cavity of the peritoneum, may almost always be felt, and even heard, both by patient and physician. The latter will be most sensible to it, on pressing his fingers pretty firmly against one side of the belly, and striking the opposite side with a quick smart tap.

It is sometimes difficult to distinguish ascites from pregnancy, especially when it is the result of amenorrhœa, or other uterine disorder, and mistakes are recorded, as having been made by the most experienced and skilful practitioners. For the special signs of pregnancy we must inquire with diligent attention, not forgetting to institute a stethoscopic examination, which, in some instances, will prove decisive. When these signs cannot be detected, and more confidently, if there be present the usual marks of the general hydropic diathesis, we will regard the case as one of dropsy. Indeed, the two conditions not unfrequently occur, and prove highly embarrassing.

The general *prognosis* is rather unfavorable in abdominal dropsy. In particular cases, it will require to be formed upon a consideration of the patient's state of constitution, age, habits, and the history of the cause or mode of origin, if it can be made out. We entertain the best hopes, where the attack has been recently developed in a young subject previously healthy, as the consequence of some obvious influence, transient in its action, as when it has followed one of the exanthematous fevers, or some acute inflammatory disorder of the abdominal viscera, and when the system still retains a fair proportion of its elastic energies. In the contrasted class of asthenic or atonic dropsies, coming on slowly, with chronic derangement of the functions, especially if anasarca or hydrothorax supervene, there is little chance of recovery.

The *treatment* of ascites is to be guided by the principles already laid down in the preliminary discussion of general dropsy, and stated, in more detail, under the last head—of anasarca. But as the abdominal effusion very rarely precedes the others, even in the best marked instances of the hydropic diathesis, without being connected directly or indirectly with some functional or organic derangement of one or more of the viscera, we must give our special attention to such probable form of local disease.

Under these circumstances, we must place our chief reliance upon mercurial remedies, whose deobstruent and alterative influences seem essential to our success. Aiming at the slow and permanent effect which they are to produce, we must administer them in small quantities, and in the mode least irritating and debilitating. There is no need of carrying out this plan to the extent of ptyalism; nay, I have, I think, observed that salivation detracts from its benefits. Cautiously watching the patient, therefore, it will be proper to intermit its use, or desist from it for a time, as soon as the least sponginess of the gums, or tenderness of the teeth, shall become perceptible. The mercurial should be administered not alone, but in such combination as may be indicated, with opium, squill, digitalis, etc., and should be occasionally left out of the prescriptions, while they are continued. If calomel prove purgative, or otherwise irritating, the blue pill is almost of equal utility.

On the same view of directly relieving the abdominal viscera, we must determine to the surface by revulsives. It may be proper to premise the application of cups or leeches to the belly, if the surface be tender on pressure, or any inflammatory enlargement of liver or spleen be observed on examination, which should be made carefully and repeatedly. In obscure cases, attended with febrile excitement, it is also proposed to leech and cup the loins, so as to relieve the kidneys from congestion or inflammatory irritation. This will be more definitely indicated by feelings of uneasiness in that region; urine, high colored, or tinged with blood, or showing, by readiness to coagulate, an undue proportion of albumen. These means of topical depletion having been instituted, we may find much advantage from the employment of fomentations and poultices. Gentle and long continued friction with warm oil over the whole surface is said to prove in a singular degree diuretic, and to give much solace to the uncomfortable sense of distension.

Blisters have been highly recommended by some writers. They may unquestionably be indicated as very powerful revulsives, where there is visceral enlargement and engorgement, and when there still remain tokens of internal inflammation, as shown by local fixed pain, or a sense of heaviness in every part. They are eulogized, however, as evacuants of the watery accumulation in the cavity, an effect which I would by no means expect from them, nor know how to account for. A wonderful story is related by Dr. Caldwell, in his edition of *Cullen's First Lines*, of the escape of a vast quantity of fluid, sixteen quarts, as he calculates, from the abdomen of a lady, by means of, and through a blister (the second), applied upon the stomach. The effect here is astonishing; he, himself, remarks, that "the case is unique—the records of medicine offer no parallel." A second instance, of similar nature, has since been referred to by Professor Chapman, in the latter edition of his *Therapeutics*.

It would be unnecessary to occupy space with a repetition of the details of the management of dropsy, given in speaking of anasarca, and equally applicable here. Ascites, however, it should be observed, is more usually of the entonic character than anasarca, and more generally connected with those modes of excitement, local and general which bear and require depletion. The lancet, then, the hydragogue cathartics, emetics, and diaphoretics, may be used with greater freedom, though still with a due degree of caution, and an unremitting regard to the actual condition of the patient.

When we fail to check the accumulation of fluid by the treatment above laid down—when the absorbents refuse to take it into the circulation whence it has been deposited, and we are unable to drain it off through either of the natural outlets, the skin, the bowels, or the kidneys, the distension of the unhappy patient becomes intolerable—the integuments of the belly yield to the pressure within, and fissures occur which inflame and ulcerate; it is impossible to lie down or rest from the oppression of the thoracic viscera, and death, with all its terrors heightened by the tedious slowness of its approach, becomes inevitable. Under these circumstances, the operation of paracentesis becomes necessary.

The water contained in the cavity may be both easily and with very general safety drawn off by a lancet or trocar, armed with a canula; and it is amazing what quantity of fluid may be thus accumulated. Four to seven, and even eight gallons, have been often met with. Stoerck mentions a single collection of twelve and a half gallons. But the most extraordinary case on record, is one which is detailed in the inaugural thesis of Dr. Caughman, of Lexington, who graduated in the medical college of the State of South Carolina, in 1835. He relates the case of a young female patient, from whom, at one tapping, twenty-one gallons of water were taken. It was, with good judgment, drawn off slowly, for fear of the evil effects of the sudden abstraction of such an immense quantity, occupying between three and four hours, with occasional intervals of fifteen minutes. In a few days after, six gallons more were drawn off, and, in three weeks after, four gallons (thirty-one gallons in all). She died a little while subsequently to the third operation.

The evacuated fluid differs very much in appearance and qualities It is frequently limpid—generally has a light straw color—is sometimes greenish, brown, thick, sanious, fetid, etc. Any of these unpleasant variations in its character are regarded as affording reasons for an unfavorable prognostic. Many patients have lived to undergo the operation repeatedly, for numbers of years in succession, the disease continuing, but its fatal tendencies being counteracted, by thus affording, mechanically, an artificial outlet for the effusion to which it tenaciously gave rise. I have heard of a patient, who, for thirteen years, was under the necessity of seeking relief in this way; and a case is related in the *Edinburgh Medical Communications*, in which the operation was repeated ninety-eight times in the course of three years.

There are several instances in the books, of spontaneous rupture of the umbilicus, with complete discharge of the water through this opening; and Good gives us, from Paullini, a story of a dropsical subject, who, refusing to submit to the trocar, "had the good luck to be gored in the belly by a bull," which wound effected the evacuation of the fluid, and his recovery.

After the collection is drawn off, a bandage should, in every instance, be brought firmly round the body, to prevent the faintness and sinking consequent on the abstraction of what has been coarsely enough called "the stimulus of distension." The symptoms probably result from the sudden entrance of a considerable amount of blood into vessels from which the due circulation had been expelled by previous pressure, thus deriving from the brain and heart a portion of their accustomed quantity, greater than they can spare, unless in some measure sustained. For this reason, it is usually proper to offer the patient, when the operation is near its end, some moderate stimulant.

But the good effect of the bandage does not seem to be limited to this transient service. We have, on respectable French authority, that of Husson, an instance of complete and permanent cure of ascites, effected by pressure applied in this way. "Under the influence of this measure," he says, "the urinary secretion increased, the volume of the abdomen diminished, and all sense of fluctuation soon disappeared." This method of treatment, however, did not originate with Husson. The old English physician, Mead, used to keep up a steady pressure upon the abdomen after each tapping, and he relates two strongly marked cures thus obtained.

In attempting to imitate this successful management, we must take care to put on the bandages as closely as they can be borne by the patient, and to keep them constantly and equably applied in this way.

Still more recently, a heroic method of practice has been followed, suggested by the apparent analogy with hydrocele, and the success of attempts to effect adhesions of the sides of the serous sac, or to change the condition of its surface as a secreting or exuding tissue. If we may believe Roosbroeck, however, it is a proposition of no modern origin; he says that "in the earlier ages of medicine, it had been attempted to inject stimulating fluids, vapors, or gases, through the canula into the abdomen after paracentesis." Spengler ascribes "the bold idea of using iodine injections for the radical cure of ascites," to Dieulafoi, of Toulouse. It was indeed "a bold idea;" one that has not yet found general favor with the profession anywhere, and, so far as I am aware, has not been, in this country, the object of a single experiment. We have a very favorable report upon, and recommendation of the treatment of ascites, by injections of various kinds into the cavity of the peritoneum after paracentesis, by Boinet, published in the *Medical Gazette*, Paris, Aug., 1851. From him, we learn that—

Injections	of vinous vapor	have been used	with success	3 times in 4
"	of protoxyd of azote	"	"	3 " " 4
"	of alcohol and water	"	"	once.
"	of warm water, with decoction of cinchona,			"
"	of tincture of iodine, with water,			9 times.

This latter formula he himself decidedly prefers, and advises to be prepared as follows:—

Of water, 150 grammes,
" iodur. of potassium, 2 to 4,
" tinct. iodine, 25 to 32.

This solution to be thrown in at once. We meet with cases occasionally which seem in a certain degree and extent insulated, or so far local, that the symptoms of general dropsy or the hydropic diathesis, subside, or cease to progress, leaving the patient to contend with the peritoneal effusion alone. To such cases, I regard this daring measure as being well adapted, and of hopeful influence.

The drinks and diet, in ascites, should be nutritious, or even moderately stimulant. During convalescence, much stress must be laid on exercise, and sedentary occupations altogether abandoned. Without muscular exercise in the open air, all efforts to prevent a return of the disease will be absolutely fruitless. If the means of the patient permit, a long journey on horseback in preference—or a sea voyage must be undertaken.

HYDROTHORAX (*Dropsy of the Chest*).—Under this title, I shall comprise all the collections of serous fluid occurring within the cavities of the chest, whether within the sac of the pleura, hydro-pleura, or within the investing membrane of the heart, hydro-pericardium, or the cellular infiltration of the lungs themselves, anasarca pulmonum.

There has been much dispute as to the nature of these serous accumulations. It is easy to employ such language as shall prevent confusion. Effusions entirely local, occurring as the result of previous inflammation in the part, and subsequent lesion, I would refuse to consider as properly dropsical. On the other hand, if the thoracic collection were coincident with collections, elsewhere, with anasarca or ascites, no matter though consecutive upon previous disease, I would regard it as idiopathic, because built upon the hydropic diathesis, an essential character of the history of true dropsy. The difficulty seems to lie in the promiscuous use of the phrases consecutive and symptomatic. But the dropsies which follow certain hepatic affections, and some forms of anemia, are at the same time consecutive and idiopathic. No matter in what mode the constituent predisposition may arise, its full development into the peculiar diathesis constitutes the disease; while, on the other hand, no matter how large an effusion may occur from a local morbid action, dropsy cannot properly be said to exist, unless a special morbid state of constitution be generated.

Hydrothorax is more apt to occur after the middle term of life, and in subjects whose constitutions have been broken down by intemperance, or by previous ill health. There is paleness of the face, with some lividity of the lips—dyspnœa augmented upon the slightest muscular exertion—the patient pants much, and is distressed with a sense of oppression and constriction of the chest, on mounting a stair; these symptoms are aggravated, as the case progresses, into orthopnœa, which adds infinitely to his sufferings, by preventing his seeking repose in a recumbent posture; and this inability to lie down is, in almost every instance, much more urgent on the approach of night. There is usually some cough, with a slight mucous expectoration. Anasarca soon appears, and sometimes, though by no means as frequent an attendant, ascites also. The general health is, in the meanwhile, much impaired; the appetite diminishes; there is often nausea, with vomiting, in the mornings; the strength decays; the pulse is voluminous, and perhaps hard—is frequently intermittent, with or without palpitation, and a sense of impending suffocation; there is languor, with drowsiness; the urine is scanty and high-colored; the bowels irregular, often costive; the skin relaxed and cold. In the advanced stages of the attack, one side of the thorax may be found fuller than the other, and observed to move less in respiration.

The *diagnosis* of dropsy of the chest is sometimes difficult and obscure, whether we refer to the special locality of the effusion, or the distinctions which separate it from other diseases. Its symptoms are often counterfeited by other affections, such as asthma, empyema, angina pectoris, chronic pleurisy, certain diseases of the lungs themselves, organic lesions of the heart, and aneurism of the large vessels near it. "So remote from certainty," says Blackall, "are the diagnostics of hydrothorax, that in one in whom all except the sense of fluctuation were combined, a pulse in every way irregular, palpitations, coughs, dyspnœa, inability to remain in bed a single instant, suffocation and deliquia when sleeping even in his chair, with an anxious embarrassed countenance, the whole injury was found, on dissection, to be seated in the body of the lungs, and in the lymphatic glands at its root." We shall not often err, however, I think, if we pay proper attention to the symptoms belonging to the history of dropsy. If these, whether in greater or less degree, are conjoined with dyspnœa, notably increased on taking exercise, orthopnœa, which undergoes special aggravation at night, threatened suffocation and faintness, not only on attempting to lie down, but whenever the disposition to sleep is yielded to, palpitations of the heart, and frequent intermissions of the pulse, the nature of the case is sufficiently clear. If to these we add a fulness, perceptibly greater on one side than the other, we attain a reasonable certainty.

When the chest is distended with fluid, the respiratory murmur will no longer be heard, or be very indistinct, and percussion will detect the absence of resonance. If the conditions of particular parts vary in this respect, with the changes of the position of the trunk of the patient, we pronounce the effusion to be within the pleura. Ægophony will be heard in the early stages, when the amount of effused fluid is small, and again when the patient is convalescent, but it is a transient symptom, often escaping notice. If the loss of respiratory murmur, and the dulness of resonance are confined in all positions, to the lower portions of the left side, and the sounds of the heart be indistinct, and the ribs pressed out, we infer the presence of hydrops pericardii. Anasarca pulmonum is known by its coincidence with general anasarca, and the diffused dulness on percussion, and unchanging impediment to the respiratory sounds.

Bichat proposes, as a test, to apply pressure upon the abdomen, which, he says, will be found very much to increase the sense of suffocation. Some dwell upon the occurrence of a fluctuation within, perceptible, it is stated, to both patient and physician. I would depend on neither of these. Fluctuation is always obscure, and sometimes cannot be detected in well marked cases. Marshall Hall proposes in doubtful conditions, "puncturing the chest with a small flat trocar." We may "make assurance doubly sure" by this measure, when paracentesis is indicated, and has been determined on; but I do not think we should be justified in lightly adding the risk of a penetrating wound of the cavity, to the other evils already urgent enough.

The general *prognosis* in hydrothorax proper, is unfavorable. In particular cases, we must be influenced by the age, condition, and habits of the subject. However much relieved, it is apt to return, when, of course, the prospects of ultimate cure become darker, and less hopeful.

Autopsy.—The appearances, on examination of bodies dead of hydrothorax, vary with the previous history of each case, and with the special locality affected. The investing membranes, the heart and the lungs, are found affected in different modes. The pleura is sometimes thickened, sometimes roughened with flakes of adhesive lymph, sometimes unchanged. These varied appearances of the pleura are sometimes so remarkable, that they have given occasion to Laennec to say, "that there are cases where the distinction is difficult, even in the dead body, between hydrothorax and common pleurisy."

It is an interesting question, whether the changes in the conditions of the heart, so often met with in dropsies of the chest, are the causes or the effects of the disease. I have most often found the organ enlarged or softened. Where any considerable amount of fluid is contained in the pericardium, this membrane, says Copeland, is not reddened or injected; it is somewhat paler or whiter than natural; but it is generally opaque and slightly thickened.

There has been much dispute as to the normal quantity of fluid contained within the pericardium, and the point of increase at which dropsical accumulation can be said properly to commence. Hoffman and Senac deny the presence of any fluid about the heart in a state of health; but a majority of physiologists, including Vesalius, Haller, Corvisart, Bertin, think that there is a small quantity. Corvisart, generally followed, believes, that when this is augmented to six or seven ounces, we shall have the symptoms of hydro-pericardium. Laennec doubts the clearness of our diagnosis, even with twice or thrice that amount.

When the lung has not been previously inflamed and hepatized, or otherwise changed in structure, it is apt to yield to the pressure of the fluid contained in its investing membrane, and become condensed and very much contracted in dimension. Dr. Baillie has seen "the lung from this cause, compressed to the size of a closed fist." I once met with a similar instance, in which it presented a solid, but not hard or heavy mass, even smaller than a man's hand; the cavity of the thorax on that side, being occupied with a great quantity of fluid, and a heart much enlarged and softened.

In what is called anasarca pulmonum, the respiratory cells which receive air from the bronchi, are compressed or closed by the fluid, infiltrated among the loose tissue of which these organs are composed.

The causes of hydrothorax are those of dropsy in general, determined to more direct and primary action upon the chest, by predisposition generated by former or existing disease. Long continued bronchitis and asthma are accused of aiding in this way specially to produce it.

The *treatment* of this form of dropsy differs little from what has been already detailed, in speaking of anasarca and ascites. The modifications required, may be briefly expressed, as consisting in a freer use of the lancet; less dependence on cathartics; a greater confidence in the class of diuretics so called; and a more urgent necessity for the employment of opium. Venesection is very much trusted to by many respectable practitioners, who regard it not only as the quickest means of relief from suffering, but as the most indispensable remedy. Where there is any degree of pain in the chest, and tension across it complained of, while the strength and pulse are tolerably good, and the dyspnœa urgent, I would open a vein. Let the patient sit erect during the operation; let the orifice be large, and let the blood flow until some obvious effect results. Repeat the venesection within a few hours, if the same demand for it becomes again urgent. In ordinary entonic cases, occurring in subjects of ordinary vigor, and in the earlier stages, the evacuation is usually well borne, and will then be of decided benefit. Home, we are told, resorted to it in one case seven times in eighteen days, with success. I need not repeat here the usual cautions. In the opposite class of instances, in old subjects, atonic cases, asthenic constitutions, protracted attacks, it is best to abstain from it absolutely, or experiment with it very carefully. It is well to be aware that the pulse, in this unmanageable disease, is far from being a safe guide; even in the most unequivocal states of prostration, it often continues hard, voluminous, and incompressible to the last moments of life. We must take into consideration the whole history, and all the symptoms collectively.

There has been much dispute concerning the employment of cathartics in hydrothorax. For my own part, I never hesitate to prescribe the hydragogues formerly spoken of, in recent cases, consecutive upon, or connected with, febrile or inflammatory states of the system. Calomel may be so combined with the other requisite medicines, as to act sufficiently in this way; and the alterative influences of the mercurials are peculiarly indicated on account of the almost universal visceral obstructions, induration, and disorder, that present themselves in the subjects of hydrothorax. The super-tartrate of potass. has received high encomium for its adaptation here, both as hydragogue and diuretic. Some go so far as to attribute to it an undefinable and specific power in the cure of dropsy. Thus Ferriar, Home, and McLean state, that they have succeeded with it when it has occasioned no sensible effect. This latter writer and Milman, both affirm, that when it has prevailed, and the patient is relieved of his aqueous accumulations, he is sometimes left so weak and emaciated, as to die of mere debility, "without any evident cause." McLean ascribes this to its "extreme power of exciting the absorbents." I believe it to be better accounted for, as I suggested before, by its effect in weakening the digestive functions, and its direct action as a sedative, in destroying the tone of the stomach.

From ancient times, a universal preference among remedies, in the treatment of diseases of the chest, was adjudged due to diuretics, as expressed in the maxim of Baglivi, "In morbis pectoris ad vias urinæ ducendum est," and in none of these maladies has it seemed more natural and reasonable to expect advantage from them, than in the case under discussion. Accordingly, the general practice in thoracic dropsies has consisted of little more, after venesection has been premised, than a series of experiments with diuretics. Of these, the universal voice (with a few exceptions), may be said to be in favor of digitalis. Darwin asserts confidently, that "it empties the water more readily from the thorax and limbs, than from the abdomen; and that it is peculiarly suited to relieve, when the constitution is broken by debauchery and drunkenness." If this be true, and if Withering and McLean be right, that it is specially useful in cases "of great paleness and laxity of fibre," and in attacks brought on by intemperance, it must surely be deserving of a trial here, where so many of these conditions usually concur. My own opinion of it is favorable also, though I cannot venture to boast of great success with it. I prefer to employ it in combination with the mercurials and some saline diuretic; carefully avoiding ptyalism, on the one hand, as uselessly annoying and irritating, and, on the other, the sudden supervention of exhaustion, against which we should always be on our guard, when exhibiting these powerful drugs.

The squill has been selected by some physicians, as possessing here a double adaptation, and likely to be serviceable, as well by its expectorant as its diuretic qualities. It is said to alleviate the dry and teasing cough, and act as a good revulsive, by exciting the excretories of the pulmonary mucous surface to an increased discharge. I have known it productive of decided benefit as well when given alone as when combined in the same manner with digitalis, with nit. potass., and with calomel or blue pill. Nor have colchicum and tobacco failed to receive, from high authority, similar unqualified encomiums. They may be used in turn, and will often do valuable service. In a disease of such obstinacy, and so frequently of long protraction, an extended variety of resources is demanded. Prescriptions become tiresome and disgusting to the patient, or his stomach rejects them, and a change must be made. Two of the more stimulating diuretics have been employed here—turpentine and cantharides; the latter of which has been loudly extolled by Prof. N. Smith, of Yale College, who considered it peculiarly well adapted to the cure of dropsies of the chest. He combined it with squill.

The diaphoretics are little used in hydrothorax, simply for their sudorific powers. The seneka and ipecacuanha, which are expected to assist in promoting a free discharge of mucus from the air-tubes, are sometimes employed, chiefly, however, as expectorants. With similar views, the antimonials are occasionally prescribed; and lobelia has been administered in cases combined with, or consequent upon asthma, with advantage.

Opium is one of our most indispensable remedies, although, in resorting to it, we are forced to encounter strange prejudices, which, I regret to say, are not exclusively confined to the vulgar, but may be met with in educated physicians also. It is but too common to regard the dyspnœa and orthopnœa of hydrothorax as the mere mechanical results of the presence of effused fluid within the cavities of the chest. This view of the matter is entirely unsatisfactory. The pressure to which all the distressing symptoms are thus ascribed, can vary only by change of position, the quantity of fluid remaining the same from hour to hour. But it is well known that many patients breathe comfortably by day, who suffer greatly as night approaches; and that some who sleep refreshingly by day, are unable to doze at night without the threat of immediate suffocation and syncope; and that some take rest in a recumbent position by day, who cannot recline in any degree at night, but are forced to preserve strictly the erect position. Nay, these paroxysms of difficult respiration subside spontaneously, in many cases, with the return of morning, after nights of desperate struggling for air, with all the horrors of impending death. Further than this, every physician of experience will testify that he has seen notable relief of this paroxysmal dyspnœa follow the use of the lancet, and occasionally, also, the effect of a free and relaxant emetic, in these respects resembling closely the history of some asthmas. From such facts, I have been led to suppose that the effused fluid acts upon the lungs, not merely by its mechanical pressure, but as an irritant, exciting vascular disturbance, on the one hand, and spasmodic constriction on the other, which modes of derangement follow the laws of periodicity. Thus we account for the relief afforded by venesection, by emetics and expectorants, and hence we are also led to anticipate benefit from the use of opium. I prescribe it freely, and in full doses, both alone and in combination, as may be required. With ipecac., as in the Dover's powder, it will often act like a charm in relieving the intense distress and miserable anxiety of the patient, and allowing him to find a brief repose from his indescribable sufferings. There are few cases in which this anodyne may not be granted nightly. So far from interfering with the good effect of such other treatment as may be indicated, the use of opium will be found greatly to promote it.

In none of the forms of dropsy will we obtain more prompt and definite advantage from the application of external revulsives. Under the same contingencies which require the lancet, we may deplete topically, by cups to the chest. Dry cupping will be found serviceable when the strength of the patient will not admit of the loss of blood in this way. Warm poultices, with mustard, will sometimes give great, though transient solace to the nocturnal dyspnœa. But vesicatories should in no case be neglected. They should be among our earliest remedies, and a succession of them kept acting upon different parts of the thorax. They rarely fail to afford more or less relief, though they are more specially demanded in the instances so frequently presenting themselves, and on which so much stress has been laid by Laennec, where there are combined, prominently or obscurely, the symptoms of chronic pleurisy, or other internal inflammation.

Much and warm dispute has arisen concerning the propriety of the operation of paracentesis, as a means of removing the accumulation of fluid effused within the cavities of the thorax. The mechanical evils produced in the present case, by such accumulation, are more urgent than in the instance of ascites, and the opening may be as safely and beneficially made in the thorax as in the abdomen. Something has been said of the danger of collapse of the lung from introduction of external air; but this seems to me to be much overrated. Copeland, who, by the way, is no friend to the operation, affirms "that if the wound be carefully closed after a deep expiration, the resiliency of the lung, and the absorption of the air, will overcome this difficulty." I fully agree with him, however, in the advice to take every precaution to avoid the entrance of air, as "acting unfavorably upon the inflamed or otherwise diseased membrane," and in the suggestion that it is better to heal the wound as quickly as possible, even if it be probable that tapping may be again demanded. The continental physicians of Europe are much more in the habit of drawing off the water, in hydrothoracic cases, than their brethren in England and America, who have, perhaps, carried their reluctance or negligence in this matter to a culpable extent. Even in hydro-pericardium, it has been performed, and, in two cases, by Romero, with success. Like Cullen, I have seen it but once attempted, and with no very flattering success; yet, I feel no hesitation in advising a resort to it in properly selected instances, both from reasoning and the reports in its favor, made by numerous respectable authorities in Italy, Germany, and France. From the distended sac of the pleura, quantities of fluid have been evacuated, that are almost beyond belief. The frequency of its repetition has also, in certain cases, been very great. Good, in his Nosology, has preserved some of the records. Four hundred and twenty-seven pounds are thus said to have been drawn off, within ten months, from one patient; from another, four hundred and ninety-five pints in one year; and from a third, by eighty tappings, in twenty-five years, six thousand six hundred and thirty-one pints. More wonderful than all, we have an Italian account of one hundred and fifty pounds having been evacuated at once. In the *Berlin Medical Transactions*, there is an instance of a cure effected by an accidental wound of the thorax, which gave vent to the fluid collected in the pleura.

HYDROCEPHALUS (*Dropsy of the Head*).—This collection of serous fluid within the cranium may occupy various localities; it is most frequently found in the ventricles, distending them, and pressing outwards; it is sometimes poured forth upon the surface of the arachnoid; it has been met with, though not often, between the dura mater and the skull: it has been said to affect the brain with a sort of anasarca, the cerebral substance itself being infiltrated.

The *pathology* of hydrocephalus, and its proper nosological position, have been matters of much dispute. It is not commonly associated with the other forms of dropsy. Its occurrence cannot be shown, in the great majority of cases, to depend upon the development of the hydropic diathesis. In a very large class of cases, its connection with the ordinary marks of inflammation is obvious, and in a majority of them, the effusion is apparently the mere result of the vascular action previously highly excited. Finally, its general treatment differs much from that proper in other dropsies, and it is little influenced by the remedial measures usually found to be specially adapted to their cure.

I confess, for my own part, the difficulty of replying to these arguments, and the obscurity of the case. Yet, I do not regard them as absolutely conclusive, and have been led to adhere to the ordinary arrangement of hydrocephalus for the following reasons: Although it is not often found connected with the more familiar varieties of dropsy, or with the hydropic diathesis, yet it would seem that this is sometimes the fact. Blackall tells us that the urine, just at the commencement of hydrocephalus, is often albuminous, as in other dropsies. He has also witnessed, not only the extension of hydropic diathesis to the head, but, also, metastasis of the disposition to serous effusions from other parts to the head, both in anasarca and hydrothorax. Something of this latter kind has occurred in my own observation, in four instances, three of them anasarca, and one of them general dropsy. The first, a negro girl, aged about nine years, had recovered from the mumps. She was anasarcous, with, perhaps, some abdominal effusion also. Though the skin was much distended, and her general health impaired, she was able to sit up, and even to walk languidly about. On a sudden, the anasarcous tumefaction subsided remarkably in the limbs and trunk, while the swelling of the face and head increased enormously; she complained of blindness, convulsions came on in a few hours, and continued through a night, with little intermission, the pupils of the eyes being fixed, or insensible to light, and the pulse small, corded, and very frequent. She finally recovered. The second, a negro boy, aged ten years, was attacked in November, 1829, with erysipelas of the face, which was followed by œdematous effusion of the eyelids first, then of the whole head, gradually developing a general anasarca. Having exposed himself very much one day, to a cold northeast wind, the cutaneous swelling suddenly subdivided. As night came on, strabismus was noticed to occur, which was soon followed by convulsions, from which he recovered with great difficulty, and very slowly. The third instance was very similar in its history. A colored boy, of about twelve years of age, convalescent from scarlatina, but anasarcous, having exposed himself during a cold day, was seized at night with strabismus, the left eye being much turned in, while the right side of the body was paralytic and motionless, the swelling having suddenly subsided. His respiration was stertorous. While bleeding him, convulsions came on, and were repeated often and violently; he recovered, but with great difficulty. The fourth, a friend and former pupil of my own, returned hither from the south-west, suffering under dysentery. As he began to improve, ascites showed itself, and the abdominal distension fast increased, with some effusion in the cellular tissue. Prof. Moultrie was in attendance with me. We were surprised, on paying him a morning visit, to find him nearly free from all dropsical symptoms, and disposed to exult at his prospect of quick restoration to health. Shortly after, within an hour or two, he was observed to be drowsy; strabismus was noticed; then followed stupor, coma, and convulsions, so violent and long protracted, as to threaten his immediate death. From this condition he, however, at last emerged; his convalescence being tedious, but ultimately complete.

Andral gives two cases of serous effusion into the ventricles of the brain, in adults laboring under dropsy of the cavities.

In reference to the alleged connection between inflammation of the brain and its membranes, and hydrocephalus, I would observe, first, that it does not seem to me to be uniform or invariable. However frequent the coincidence of tuberculous meningitis with this effusion, it is not proved to hold the constant relation to it of cause to effect. Congenital dropsy of the head is not very rare, and seems to be the result of some local morbid action, distinct from inflammation, none of the usual effects of which condition are noted, on examination after death. The same is true of the form, which, occurring in early infancy, is called chronic hydrocephalus, or cephalic dropsy. In many examples of this kind, there is no proof of the existence of inflammation, either in the history of the symptoms, or the appearances on dissection. But secondly, allowing what I am not disposed to deny, that in a great majority of well-marked cases of hydrocephalus, the tokens of inflammation are, in the early stages, too distinct to admit of any reasonable doubt; still, it does not follow that the effusion is a mere result of inflammation; it would only tend to establish the doctrine maintained by Coindet and others, that the disease consists in a peculiar modification of inflammatory action, of which the effusion is an essential or constituent part. I have, more than once, alluded to the probability that dropsies are connected with some degree of local excitement in the surface affected, and may quote here, as much in point, some observations of Laennec, relative to the changes of disease, as shown in the dead body: "Whatever may be the difference between a dropsy and an inflammation, there can be no doubt that these affections, so opposite in their extreme degrees, are nevertheless often very nearly allied in their slighter shades." And, again, after noticing in his dissections of dropsy, "his having met, not uncommonly, with some spots inflamed in the first, and even in the second degree, the inflammatory affection gradually shading into the merely œdematous condition of the surrounding parts; facts of this kind," he goes on to say, "point to the great affinity between inflammation and the dropsical diathesis." I shall only add, that the effusions within the cranium are similar to those met with in other dropsies, and that in a disease fatal, confessedly, in so large a proportion of cases, no positive inferences as to the Pathology, can fairly be drawn from the Therapeutic. There are not wanting, indeed, physicians who apply, in the management of hydrocephalus, the usual remedies for hydrothorax, anasarca, and ascites.

Serous apoplexy has been supposed to constitute a form of hydrocephalus modified by its occurrence in the adult. Cullen arranges the disease, of which we are treating, as a variety of apoplexy, under the title of apoplexia hydrocephalica, and this view seems to be countenanced by Copeland, Göëlis, and perhaps Andral, but I do not apprehend any danger of confounding the two affections.

Hydrocephalus is almost peculiar to young children, being rarely met with after the age of eight or ten years, and not commonly beyond the third or fourth. It assumes very obviously two forms, which require very different descriptions.

Acute hydrocephalus, of which I shall first speak, is usually divided into stages, presenting in its access or invasion, a series of symptoms, so varied and uncertain, that they have been well regarded as precursory rather than essential. In some children, a train of gastric and intestinal disturbances precede; in others, a well marked phrenitis; others, again, show the tokens of cerebral congestion; and it is not rare to see an attack of fever, of ordinary appearance, continued for days previous to any striking symptoms of determination to the brain. Under my own care, the derangement of the digestive system has almost uniformly claimed primary and prominent attention. The child is languid and fretful; its appetite is uncertain, with occasional nausea, foul tongue and fetid breath. The belly is tense; the bowels irregular; sometimes costive, but more frequently irritated into diarrhœa. The pulse is quick and corded; the skin hot and dry; the urine scanty. There is febrile excitement, more notable at night, with restlessness and thirst. The face is flushed and turgid, and the hands are often raised to the head, with moaning and sometimes loud screams. When the child sleeps, he grinds his teeth and starts much.

These symptoms having continued unrelieved for an indefinite period, a few days, perhaps, those of what I would call the second stage begin to be developed. Periods of drowsiness now alternate with the restlessness; the child seems to be in more constant pain, which it refers by its motions more distinctly to the head; the pulse becomes slower and fuller; the pupils of the eyes are fixed, sometimes contracted, but as often dilated; strabismus ensues, and the third stage is ushered in with all the peculiar and characteristic marks of cerebral effusion. The pulse is now irregular and rather weak, though it is still apt to retain the fulness of its volume; a certain degree of insensibility to external impressions is noted, which becomes more and more marked; somnolency increases into stupor or lethargy, but I have seldom observed either the absolute coma or the paralysis, which some writers describe as common. The head is more perceptibly enlarged; the imperfect ossification of the skull permitting, the sutures open wide, and the bones separate from each other; they sometimes become attenuated, and indeed have been seen perforated by absorption of the earth of which they are partly composed. The face is pale and shrunken, and the overshadowing forehead, dilated pupil and introverted eye, give a strange and repulsive expression to the countenance. Respiration is quick and embarrassed; deglutition becomes difficult; the pulse fails more and more, and the little patient sinks, from a restless stupor, with or without convulsions, into death.

Chronic hydrocephalus, or that form which is without notable fever or well-defined inflammatory determination to the head, is extremely obscure, both in its origin and cause. Like the congenital variety in its history and the appearances presented on examination, it chiefly occurs during the first few months of infancy. We are usually told that the subjects of it have been weakly children; but, for the most part, little notice is taken of any special ailment until the enlargement of the head and the openness of the sutures attract attention. The patient cries and sucks feebly; the pulse is small and compressible; there is emaciation; the pupil is dilated and insensible to light; the muscular debility is such that the child lies prostrate and moans when moved; its only spontaneous action seems to be the throwing of the head from side to side, as it rests on the pillow, and perhaps pressing and rubbing it with its hands. Diarrhœa, convulsions, and difficulty of respiration soon terminate in death.

As would be reasonably expected from the nature of the organ subjected to injury—the brain, we find a great diversity of anomalous circumstances presenting themselves in different instances. A negro child, fifteen months old, was brought to me with a very remarkable enlargement of the head, the sutures of which were wide apart and distended with fluid. The limbs of this patient were obstinately rigid and extended stiffly. The legs were stretched out and crossed at the instep, the toe being turned in. Its hands were clenched and its arm was never bent. It had been ill, I was told, about eight months, during which time its general health was unimpaired. There was no strabismus, its appetite was good, its bowels regular; it breathed well and nursed heartily; it was cheerful and lively—indeed, laughed more than most children, and was more easily amused. After some weeks this patient evidently lost ground; there were restlessness and febrile excitement; the bowels became irregular, with ulceration of the mouth and tongue; and thus it continued for a year longer, when it was removed from me, and I lost sight of it altogether.

I was called to see, in 1829, a female child between three and four years old, who had been attacked with convulsions. There was loud and frequent screaming and strabismus, and her hands were often lifted to and pressed upon her head. The convulsive muscular contractions were almost exclusively confined to one side or the other, and, strange to say, alternated apparently with a similarly transient paralysis; these contrasted affections shifting repeatedly from left to right, and *vice versâ*. These symptoms continued with little alleviation for three weeks, when she began to convalesce, and recovered slowly but quite perfectly.

It is not always that this terrible disease proves fatal, even when it has progressed into the second stage with obvious accumulation of fluid, and great enlargement of the head. Dr. Donald Monro relates the case of a child, who was brought into St. George's Hospital, with a head much enlarged. The distension continued to increase; the fever and stupor, which had at first attended, gradually subsiding, and at last ceasing entirely. The head still grew, however, so that when the child, who was one year and a half old on entering the hospital, had attained her eighth year, it measured two feet four inches round. Her intellect was as usual, and she had a peculiarly retentive memory. It was long before she could walk or preserve her balance, but she at last acquired the power. Many such records may be found in the books.

Dr. G. A. Nott, of Glenn Springs, S. C., now Professor in N. O., has favored me with a brief account of a singularly impressive instance. "I have under my notice," says Dr. N., "rather an extraordinary case of hydrocephalus, of which I send you the measurements of the head; around the horizontal diameter, 28½ inches; ditto vertical, 31 inches. These, I think, have varied very little in the last seven or eight years. The child is now nearly thirteen years of age; is not larger in the body than one of four or five; *has never walked or spoken;* has but little or no use of its limbs, and, in short, approaches as near to a vegetable existence as anything we can conceive of in a human form."

Professor Paul F. Eve, of Nashville, gives an account of one of the largest heads met with; being 33½ inches around, and 34¼ in "perpendicular circumference." The case was congenital; the patient died in convulsions at the age of 15 years; he was then no larger than a child of 7 or 8. He was never able to raise his head without the assistance of his hands. In moving from place to place he rolled horizontally. His intellect was not deficient. (*Nashville Journal*, Oct. 1854.)

The general *prognosis* in hydrocephalus is decidedly unfavorable. I speak now of cases that have advanced so far as to be unequivocally known as such. The first series of symptoms, which I have described as precursory, are by no means to be regarded as announcing a fatal termination; but they may not be connected with, nor do they necessarily tend to, an effusion of serous fluid, in which the disease properly consists as an essential part, at least, of its history. Even after obvious enlargement of the head, and clearly distinguished accumulation of water within it, we are not, as will be shown hereafter, without hopeful resources, provided there remain any considerable vigor and elasticity of constitution in the little patient. The most unfavorable cases are those which combine great intestinal disorder with febrile irritation and disturbance of the sensorial system, as shown by convulsions, etc.

The *diagnosis* of this form of dropsy is very obscure in the first stages, and, indeed, it can hardly be known then with certainty. We reason, with some probability, from a certain concurrence, just now alluded to, of gastric and cerebral derangement, developed at an age, liable, as experience has shown, to this affection. As the disease progresses, the chances of error diminish, until there is no possibility of a mistake. The immense size of the head, whose weight the infant can by no means support, not even for a moment, the strabismus, the dilated and insensible pupil, the distended sutures, often allowing motion of the bones of the cranium and perceptible fluctuation, form a picture too plainly recognized. The only difficulty lies in distinguishing it from hypertrophy of the brain, a rare affection, of which I have seen but three instances. Two of these were adults, with very large crania, who were subject to constant headaches, increased and complicated with febrile and other general disturbance upon any mental excitement.

Many years ago, a little boy, about one year old, was brought me by his mother, with a request from her medical attendant, that I would examine him. His head had undergone a sudden and very remarkable enlargement, such that I found it, on measurement, exactly the size of my own, both in horizontal circumference and transversely. His health was in no mode or degree impaired. The enlargement did not increase, as I from time to time proved by repeated measurements. He went to school in due course of time, where, as his master informed me, he was inferior to none of his fellows, either mentally or physically, and has grown up stout and active. A few years since he removed with his parents to the far West, and I know no more of him.

This cerebral hypertrophy can hardly be known during life, however strongly we may be led to suspect its existence. Morgagni certainly alludes to it, but only as detected after death. Laennec seems to have known it only in the same way, judging from his description of it. Jadelot distinctly admits his confounding with hydrocephalus cases "which do not show anything else, on opening the body, besides this disproportion between the brain and the cranium." Laennec says "its symptoms are very analogous to those of hydrocephalus." Solly gives cases from Scoutetten and Dance exceedingly similar. He quotes other cases from Dance, Sims, Mauthner, and Meriadec Laennec, quite unlike hydrocephalus, and in no respect resembling each other; presenting, indeed, no characteristic features from which it would be possible to draw a diagnostic.

There is another cerebral disorder to which, on account of the importance of distinguishing it here, our attention has been directed by Dr. Marshall Hall, to whose zeal and sagacity our profession owes so much. He calls it "an hydrocephaloid affection of infants, arising from exhaustion;" and ascribes it to the prostration induced by diarrhœa, or bloodletting. His description makes it very closely resemble many of the examples of hydrocephalus, from which he says it is to be distinguished "by observing the condition of the countenance, and by tracing the history and causes of the affection." He depicts the countenance as "pale, the cheeks cool or cold, the eyelids half closed, the eyes fixed and unattracted by any object placed before them, the pupils unmoved on the approach of light." Solly classes this condition as one of "anæmic coma." Abercrombie describes it as "a state of pure coma, scarcely distinguishable at first sight from the perfect stupor of the last stage of hydrocephalus, the child lying with the eyes open or half open, the pupils dilated, the face pale, the appearance conveys the expression of coma rather than of sinking."

Dr. Bennett seems to have been among the most decided in denying with Carmichael the necessary connection of hydrocephalus with any form of inflammation, and ascribing it, indeed, to an opposite condition.

"There can be no difficulty," he says, "in admitting that serous effusion may be induced by functional and organic changes very difficult from inflammation or any allied action." He was, perhaps, one of the first to suggest the doctrine so generally received at the present day of its essential connection with scrofulosis or tuberculosis. Indeed, it is regarded by many as a mere result of tubercular meningitis; the serous effusion being the termination of an acute or chronic irritation and inflammation of some portion of the membranes of the brain, dependent upon, or, at any rate, coincident with the presence of tubercular deposit within the tissue. But this coincidence is by no means uniform. In numerous cases, examination after death has failed to show any such deposit of pseudo-plasma within the cranium or elsewhere. To the list of such examples, I will add one very much in point, from the *New York Journal*, of Sept., 1854. It is given by Dr. Cox, Physician to the State (N. Y.) Emigrant Hospital: "A female infant, of German parents, eighteen months old, the tenth child of its mother, had been well until its sixteenth week, when it became restless and feverish, and the head began to increase in size. It teethed easily, except a little diarrhœa. It died eight days after admission to the hospital. It never had convulsions. The anterior fontanelle was unclosed, the sagittal sutures unossified, the vessels of the brain congested, some of the cerebral convolutions nearly obliterated, and the hemispheres were separated, from the weight of the fluid within the cranium. Twenty ounces of limpid serum escaped from the lateral ventricles, which were distended like two sacs one-sixteenth to one-eighth of an inch in thickness. There were no flocculi in the fluid; the lining membrane of the ventricle was thickened; no granulation nor roughness was found about the corpora striata or elsewhere; the choroid plexus was not anæmic. There were no tubercles in the lungs, liver, spleen, nor kidneys, nor were the mesenteric glands enlarged."

Autopsy.—The appearances observed after death will have been clearly enough anticipated, from what has been already said. We are struck at once with the deformity and disproportion of the enormous head, contrasted with the small, shrunken face, and the emaciated body. The mucous digestive membrane is found inflamed and ulcerated very frequently. Some anasarcous infiltration is generally noticeable. Within the skull is found an accumulation of serous fluid, varying in quantity from ounces to pounds. This is most generally contained within the distended ventricles, the brain being pressed outward so as to resemble a pulpy sac, the sides of which have been seen by Baillie and Wistar, no thicker than one-eighth of an inch. Brown gives a case, elsewhere alluded to, in which "the brain, forming the containing sac, was completely unfolded, and no thicker than the dura mater."

Sometimes the effusion takes place between the dura and pia mater. Such was the fact in a case reported by Dr. J. Glover, of this city, in which the brain was absorbed or condensed into a very small compass, being "not much, if any, larger than an egg," and yet, we are told, "the little patient had retained her senses to the last, and appeared to possess many of the faculties of her mind."

I received the following history of a similar case from Dr. James

Yonge, of Fairfield district, S. C.: "The subject was a male infant; it was nursed by its mother, and seemed healthy until it was about two months old. The first symptom noted was an enlargement of the head; increased arterial action succeeded, and afterwards coma and convulsions. The disease lasted about six weeks. The power of vision was evidently impaired. It seemed to retain the sense of taste, showing an anxiety to take the breast. The upper extremities became insensible. The lower extremities seemed to retain their usual sensibility until death. Examination after death showed the sagittal and coronal sutures spread something like two inches. I laid open the integuments and dura mater in the course of these sutures, and found the cranium filled with about two pounds of serous fluid, which had been effused between the dura and pia mater. The substance of the brain seemed to have been completely removed. After the fluid drained off, there appeared to be nothing in the cranium but a texture of fibrilli, completely interlocked and wrapt in the pia mater, the whole not being sufficient to cover the base of the skull." Sir Everard Home has published a case of hydrocephalus, in which the medulla oblongata, aud a small medullary pulp behind the orbits, were the only remaining parts of the brain.

I have already mentioned that the effusion has been found not only within the pia mater and upon the very surface of the brain, but, as Gölis affirms, infiltrated within the fibres and interspersed among the cerebral substance. A still rarer locality is that spoken of by Lieutaud—its accumulation between the dura mater and the skull itself. The following case, which occurred under my notice, appeared to be of this nature, and from its singularity, perhaps deserves to be detailed here.

In the winter of 1826–27, the child of a gentleman of this city, being then about ten months old, was somewhat ill with symptoms of rather equivocal disease, the bowels seeming principally affected. While in this state, it fell from the arms of its nurse and received a severe blow on its head. Whether the cranium was fractured or not is uncertain; but when I first saw it, some days after its fall, it was easy to perceive a want of a portion of the bone and an opening in the lambdoidal suture, near the upper angle. The integuments of the head were here protruded by a fluid, which could readily be pressed back within the cranial cavity, the scalp being distended when it exuded, and wrinkled when it was pressed back. There were no tokens of local inflammation, and the former symptoms of constitutional disease had all subsided as soon as this fluid protuberance was observed. The patient is now a healthy young man, but the depression or hollowing of the skull still remains very obvious. It is proper to add, that no striking effect followed the attempt to keep the fluid within the skull—no stupor, coma, or the like. Under a course of active purging, the apparent amount of fluid diminished gradually, and the perforation slowly filled up with bony matter, but never perfectly to the level of the neighboring surface.

The *causes* of hydrocephalus, enumerated by authors who have written on this subject, are exceedingly various, and present a lengthened list. Of the predisposing, those which act previously to birth, producing the disease in the fœtus, are of course obscure. Gölis attributes it to terror and anxiety in the mother during the latter months of gestation. Intemperance in either parent is also suggested under this head. Age and sex we know give predisposition. Copeland affirms that, previous to the tenth year, it is most frequent in boys. Cheyne says that, after ten, girls are most subject to it, but it is rare so late in life. Indeed, it is very seldom met with in girls. This latter writer regards it as peculiarly connected with scrofula. I do not doubt that the strumous diathesis very strongly predisposes to it, as it often attacks, in succession, several children of scrofulous parents, such cases being almost uniformly fatal. In fact, as I have already admitted, it is very frequently connected with tubercular meningitis. Intellectual precocity, and the rapid physical development of the brain, as shown by the large size of the head in a child, are said to predispose also to it.

Among the exciting causes, are mentioned intemperance in the nursing mother; the influence of violent emotion in the infant, however aroused; rocking in a cradle; repelled eruptions, especially about the head; dentition; many previous diseases, which affect the encephalon, as pertussis and the exanthemata, and worms. I am disposed to attribute it, in a majority of the cases which occur between five months and five years of age, to some disorder or irritation in the primæ viæ, an opinion which, I think, finds confirmation and support in the whole history of the acute form of the disease and its successful management. I do not, however, agree with those who regard it as a mere consecutive affection, dependent, as well as consequent, upon such gastric and intestinal disease. On the contrary, I am satisfied, that the attacks of early infancy and of a period later than the fifth year, are, almost all, instances of primary cerebral derangement, sometimes inflammatory, but often free from any such complication, and exceedingly obscure both in their nature and origin. The older a child is, the better we shall be able to trace its source, and we shall often find it produced by the circumstances that ordinarily occasion determination to the head, cerebral congestion and phrenitis; such as insolation, furious passion, exposure to cold and damp air, metastasis of previous disease, or its extension, as in rheumatism, erysipelas, mumps, and other dropsies, concussions of the brain, from whirling, jumping, or depending positions of the head.

The *treatment* of hydrocephalus must be guided, in each particular instance, by the views which we shall be led, on mature investigation, to entertain of its cause and nature. In an acute case, where febrile symptoms concur with tokens of local inflammatory excitement, the constitution of the patient being of ordinary vigor and elasticity, our resort to the most energetic measures of depletion must be prompt and decided. When the pulse is full and hard, the face flushed, and the temples throbbing, with screaming, pain in the head, and intolerance of light, venesection should precede our other remedies. Rush, who perhaps carried the use of the lancet as far as can be justified, speaks in the highest terms of its efficacy, and relates several examples of success with it.

Cold water, poured in a full stream, at intervals, upon the head, is a very impressive means of relief under these circumstances. I prefer this to the other modes of using cold, either constantly, as by bladders, containing ice or iced water, or by evaporation, as in the employment of spirituous lotions. There can be no objection to topical bleeding, by leeches to the temples, or mastoid processes, or if they be not at hand, cups to the back of the neck.

Meanwhile, we must not neglect the exhibition of active cathartics. These constitute a most important portion of our resources in the contest with this terrible disease, and truly deserve our confidence. They act favorably, both by reducing the general excitement with which the local affection is complicated, and by deriving most efficiently from the tender organ threatened with lesion. Hydrocephalus is too formidable a malady to be easily subdued by any mode of management; and, in speaking of the prognosis, I have confessed that we have little reason to boast of the results of our treatment; but, I am unwilling to abandon the hope of a cure, while the respiration continues unembarrassed, and the patient retains strength to bear the operation of free purgatives. Such recoveries as I have witnessed are attributable, I think, without exception, to this course. Dr. Rush, after relating several cases of the successful use of the lancet, goes on to say, that he "constantly observed all the patients of whom he had spoken, to be relieved by plentiful and repeated evacuations from the bowels." The obstinate costiveness, which so often exists in the earlier stages of the attack, will render necessary a selection of our most energetic articles, and their administration in as large doses as the stomach will bear, and the plan must be persisted in, not for days, but for weeks together, regulating the effect of our prescriptions by careful attention to the circumstances of the patient. I prefer, at first, a combination of the saline and resinous purgatives, as in the mixture of rhubarb with a solution of Epsom salts; after awhile, we may alternate the ol. ricini with an occasional dose of calomel, and the combination of some alkali, potass. soda, or magnesia, with pulv. rhei. When jalap does not nauseate or gripe, its efficiency makes it available in some of the formulæ just alluded to, as with potass. or magnesia. Such additions of alkali, while they assist in the production of very large, feculent, and serous discharges, which are powerfully revulsive and sedative, prevent the accumulation of irritating secretions in the bowels, and the generation of acid, and thus tend to restore the tone of the digestive organs; acting usefully also on the kidneys.

Mercurials have long been fashionable remedies in hydrocephalus, and many cures are reported as accomplished by their exclusive employment, internally and externally; mercurial frictions over the head and body forming a part of the plan followed. Calomel, as I have said, forms a very serviceable combination with our purgatives, but I should be very unwilling to trust to it alone, and I have seen no advantage from such frictions.

Antimonials have been largely used in this disease. Laennec affirms, that he employed the tartrate with great success, administering it in enormous doses. Some of his patients took, as he tells us, five to twenty grains a day. He regarded it as acting in a peculiar and specific manner, powerfully promoting absorption. Very small doses of tart. emetic, or of James's powder, with opium, adding merc. dulc. pro re nata, have been found of service, when the skin was dry, and febrile irritation present, with vascular action somewhat reduced. Whether as a diaphoretic, or with other views, I know not, but great stress has been laid by some writers upon the employment of the vapor bath. Itard is mentioned as boasting that he had cured by it two patients out of three. Dr. Hunter, of York, also eulogizes it.

Diuretics have been exhibited by the German physicians chiefly. In our own country, and England, and France, they are little confided in. Dr. Carmichael Smith, so far as I recollect, is the only English physician who gives a favorable report of their adaptation here. He gives the preference to digitalis. Others select the more stimulating, as turpentine, and even cantharides.

Counter-irritation has been greatly relied on by some practitioners. Repeated blisters over the shaved head, to the back of the neck, behind the ears, have sometimes seemed beneficial; but they must not be applied too early. Setons and issues to the neck, shoulders, and scalp, are also highly recommended. The caustic issue is strongly urged upon our attention by Dr. C. Smith, who points out the anterior fontenelle as the proper spot to be chosen for it; he keeps it discharging for a long period of time.

Thus far, I have been speaking of acute hydrocephalus, and of its precursory and invading stages. In these alone will our remedies be found available. When the enlargement of the head, from serous accumulation within, has become evident, and in the chronic form of the disease, when this distension is the first obvious symptom, we have very little to hope, although we are not permitted absolutely to despair. In these circumstances, our most obvious and pressing indication is to endeavor to preserve or restore the impaired powers of the general system, with a view to excite ultimately the depressed actions of the organ and tissue chiefly affected. The vapor bath, the counter-irritants already spoken of, and the stimulating diuretics mentioned, of which the turpentine and cantharides promise most, extensive frictions with volatile and aromatic substances, should be employed, and a nourishing diet administered.

Yet, even in this deplorable condition of things, we are not altogether without resource. The brain yields in young subjects to a prodigious degree of pressure, and retains astonishingly its functional capacities, when its substance appears almost totally lost by absorption or condensation. The head is distended to a monstrous size; the bones separate from each other, and at the wide gaping sutures, fluctuation can be distinctly felt. The fluid may now be drawn off with perfect safety, by passing a lancet or thin trocar through the integuments and membranes. The first successful performance of this paracentesis capitis, is reported by Dr. Vose, whose patient recovered after four tappings. Dr. J. Glover, of Charleston, has recorded an interesting case in which he drew off from the head of a child congenitally hydrocephalic, six pints and three quarters of fluid in eight tappings, between the seventh and thirteenth months. It is stated, and deserves to be noted, that "after each tapping the kidneys uniformly acted more freely for several days, more urine being discharged than at other times, even when diuretics were administered." This child, whose life was certainly prolonged by the operation, "fell an easy victim to a simultaneous attack of thrush and hooping-cough." Greatwood records the case of a hydrocephalic child fifteen months old, whose head was punctured by falling on a nail, and the fluid escaping, it perfectly recovered. Dr. Conquest has collected nine successful examples of paracentesis capitis, of which four were cases of his own; he having himself operated on nine patients. It is not proper to withdraw too much of the collected fluid at once; twenty ounces is the largest amount reported; nor should the punctures be repeated too frequently. The loose pendulous bones of the cranium, must be carefully sustained by the pressure of strips of adhesive plaster and bandages, properly adapted. Indeed, this gentle and continued compression by strips and bandages, seems, in chronic cases, of itself remedial. Barnard and Sir Gilbert Blane have each recorded a case cured under this treatment; not exclusively employed, however, internal remedies being at the same time administered.

Professor Dugas, of Augusta, Georgia, has published in the valuable journal of which he was the editor, an interesting history of a child, whose life he prolonged by seven tappings. (Vol. i., 1837.)

Mr. Brown, of Haverford West, recites the case of an infant six months old, whose head was punctured eight times. At its death, a large wash-basin full of fluid was found in the sac, which was "formed by the unfolded brain."

A most instructive detail of successful treatment by this method was communicated to the *Provincial Medical and Surgical Association*, in 1840, by Mr. Kitsell. The subject was his own son, eighteen months old. When he had nearly reached the age of eight months, symptoms of subacute cerebral disease began to manifest themselves. They were preceded, as is usual, by the tokens of abdominal disorder, and irritated bowels, with paucity of urine, furred tongue, occasional vomiting, etc. With the increase of these ailments, the head became enlarged, and the parietal bones separated to the extent of two inches. Then followed the familiar, but most annoying, series of phenomena belonging to the advanced stages of hydrocephalus; "rolling of the head on the pillow, tendency to coma, contraction of the thumbs and feet, stertorous breathing, dilated pupils, strabismus, and lastly, convulsions of the most distressing character numbering fourteen in thirty hours, with opisthotonos, blackened countenance, foaming at the mouth, etc.; each fit threatening the immediate extinction of life." The head was punctured during a convulsion, the trocar being passed to the depth of two inches before any fluid escaped, the puncture being made very obliquely that it might be as valvular as possible. "The instrument was introduced about an inch below the anterior superior angle of the left parietal bone, in the direction of the lateral ventricle. About 16 ounces of limpid colorless fluid were speedily drawn off, which appeared to act like magic in subduing all the bad symptoms, no convulsions occurring afterwards. Instead of closing the wound with a compressed and retentive bandage, Mr. K. encouraged the discharge of fluid, by occasionally opening and cleansing the puncture, thus allowing it to escape probably as fast as it was secreted; this continued about five days and nights, gradually subsiding, after soaking a large number of napkins, the total quantity being computed at about four pints." Mr. K. attributes the happy result to the large opening, and the slow and constant discharge, which permitted the parts to contract slowly into their natural condition and relations. Four months after the operation, the health and vigor of the child seemed to be completely restored; the head retained its diminished size, the various sutures being closed, and was thickly covered with hair. (*American Journal*, Jan. 1850.)

SCROFULOSIS—STRUMA—SCROFULA.

The primary local origin of all diseases, is a doctrine so strongly insisted on, and so frequently referred to by a large majority of modern writers on pathology and practice, that it cannot fail to have impressed the mind of every attentive student. Of late, indeed, there seems to me some danger that we shall lose sight of a principle of little less importance, the dependence, namely, of local affections, diseases implying lesions of peculiar character, as well as functional disturbance of various organs, upon special conditions of the animal constitution, of unlimited and, indeed, universal influence. There are probably many such vitiations of the general system, predisposing to and productive of local maladies; as examples, it will suffice to refer to gout, cancer, and scrofula, the latter of which I now proceed to make the subject of a brief and comprehensive essay.

When developed, under the agency of whatever circumstances, scrofula may attack every organ and tissue of the body. The skin, the glands, the bones, and joints, the mucous membrane, the eyes, the lungs—nay, the very heart itself, have been found altered in structure. The lesions which we ascribe to scrofulous predisposition, vary somewhat in the several parts affected, but we infer with sufficient clearness their dependence upon a common source. This morbid state of the system—somewhat obscure in its nature and not easily definable—we speak of technically as "occult scrofula; the scrofulous or *strumous diathesis*." The liability of the several organs and tissues to scrofulous affections, seems in some degree to depend upon age; thus, in infancy and early childhood, we have a singular irritability of the skin and eyes, and great frequency of cutaneous inflammation and ophthalmia; next we have inflammation of the bones and joints, white swellings and morbus coxarius, or glandular enlargements and indurations, and lastly, phthisis, pulmonary consumption in its worst form. It is to be noted that some subjects go successively through all these ailments, and again, that, in many families, especially when the parents have been affected with any of these forms of scrofula, some of the children will exhibit one, and others a different local malady of the series above enumerated. I do not hesitate farther to state, that in all such families and in obvious connection with the class of disorders indicated, we shall find a remarkable liability to the production of what is called tubercle and the deposition of tuberculous matter.

Whether, indeed, *scrofulosis*, or the constitutional tendency to scrofulous deposit and inflammation, and *tuberculosis*, or the constitutional tendency to tubercular deposit with its results, are identical, is a question not yet absolutely settled. They are, however, obviously and closely related, and I shall, therefore, treat of them in connection, so far separating them as merely to bring into strong prominence the circumstances considered characteristic of each. Pathologically regarded, it would be indeed difficult, in the present state of our knowledge of them, either to set them definitely apart from each other, or entirely to confound them together.

The conditions in which we meet with them are, if not positively identical, very remarkably analogous and similar. They may be said to consist in a cachectic state of constitution, the chronic production of the crowd-poison ochlesis, as typhosis is its immediate and acute effect. "Domestication or confinement of the lower animals," says Williams, "always gives rise to scrofula. The stabled cow, the penned sheep, the tame rabbit, the caged lion, tiger, elephant, are almost invariably thus cut off. In Cornwall and Devon, the healthiest counties in England, one-half of the miners, deprived of air and light, die of phthisis pulmonalis." (*Cyc. Met.*)

The deposits which occur in the cachectic states thus spoken of as concurrent and closely associated, are affirmed by Vogel to be histologically undistinguishable. They are described as "an amorphous transparent stroma, with molecular granules, and larger corpuscles, imperfect cells, and cytoblasts. These elements are partly protein compounds, partly fat, and partly calcareous salts, phosphate and carbonate of lime." We shall see, when we treat of tuberculosis, how the same analysis is repeated, and how minute and doubtful are the points of suggested diagnosis. We shall see how divided the best authorities are on the subject; while Legrand urges the existence of definite distinctions, Mandl denies that tubercle presents any specific morphologic or characteristic elements.

Typhosis seems independent of any previous circumstances, and may arise abruptly in any, the most healthy system. It is possible, as we shall by-and-by state, that tuberculosis may be also promptly generated under very special contingencies. But, so far as we know, scrofulosis requires time, and the fostering influence of predisposing causes, for its development.

There is, in the whole circle of pathological discussions, no topic so deeply obscure as the doctrine of predisposition, which involves, as perhaps its most obscure division, the history of latent periods.

The hereditary transmission of inevitable tendencies to special disease, is too clearly obvious to admit of a doubt; gout, which does not necessarily imply, even in those who have been repeatedly attacked by it, any notable change in the structure or arrangement of any part, is transmitted only in the latent tendency; and we may suppose the offspring of a gouty ancestor to be in precisely the same condition in which his parent would be found during the intervals between his paroxysms of podagra. Thus, also, it is with those who are destined to suffer, like their progenitors, from carcinoma.

The nature of occult scrofula—scrofulosis—this latent but strong predisposition to known forms of local diseases, various in seat and in modes of development, is a subject of very unsettled dispute. A majority of recent writers are disposed to regard the strumous diathesis as essentially connected with, if not dependent upon a certain depraved state of the digestive organs. Of the truth of the assumption I am, however, very doubtful. I see, daily, cases of scrofula of great diversity, where the subjects are totally unconscious of any obstacle or imperfection in the functions of the stomach and bowels.

That the nutritive or assimilative functions are impaired, or perverted, is, on the other hand, very evident. It is probable that the original germ is often ill-developed. Thus, besides the diseased appearances above described, the infants of scrofulous parents are often born hydrocephalic, or fall into hydrocephalus soon after birth, or become subjects of rickets or marasmus. The causes which give rise to this peculiar state of constitution seem calculated, indeed, to affect the assimilative function specially, though, perhaps, not exclusively. John Hunter attributes scrofula to "dampness and cold, alternating with heat, and any agents which debilitate the system;" and adds, "that it prevails chiefly in latitudes above forty-five degrees." Parr declares roundly, that "it is not only hereditary, but, in low, damp situations, endemic." Mr. Lloyd considers "the simple or combined operation of cold and variable temperature, with excessive humidity and impurity of the air," as capable of originating a scrofulous state of the system. All agree in ascribing its production to the impure air of crowded manufactories; residence in narrow, ill ventilated lanes, low, damp houses—such as the hovels of the poor in large cities; a foul, neglected state of the skin and the clothing; imperfect shelter from the changes of atmosphere; innutritious, indigestible, insufficient diet; intemperance, indolence—which all tend to lower the degree of animal vigor, and deteriorate the physical condition of those subject to their influence. It is, as I have above stated, the chronic effect of moderate and persistent exposure to the crowd-poison, ochlesis, as typhosis is the acute result of intense and concentrated application of the same poison.

Children of parents existing under these circumstances, must be endowed with an inferior kind of vitality, and must be born diseased, or liable to the easy invasion of disease; and experience and observation have shown that certain modes and characters of morbid affection are peculiarly or inevitably apt to develop themselves. That these have a common cause in the ancestral condition of constitution, is farther shown by their occurrence in several children of the same parents, if not in all; and in their passing down, tenaciously transmitted, even after the original causes above enumerated may, for some generations, have ceased to act, or their influences have been notably counteracted. That they are also linked together proximately, by similarity or morbid identity, we infer, from the fact that they occur successively in the same individual, or promiscuously in the several children of the same parents. Thus, we shall see in the family of a scrofulous father or mother, one child suffering from cutaneous affections of a definite character, another with ophthalmia, a third with rickets, or marasmus, or dropsy of the head. As the same family advances in age, we shall see white swelling of the knee-joint in one, a second deformed with morbus coxarius, and a third with the cervical glands swollen, suppurating and ulcerating into ugly sores; and, in process of time, the whole generation becoming extinct, from the desolation of tubercular phthisis. These conclusions, I say, are irresistible from the daily repeated coincidence of the facts from which they are deduced, and we may safely and logically regard them as established beyond reasonable dispute.

While scrofula is occult or latent, we have no positive indications from which we can infer the presence of strumous predisposition, or the existence of a morbid state of constitution. There are, however, certain external marks, or physiognomical appearances much dwelt on, as exhibiting the internal tendencies. Thus, a child descended from scrofulous parents will usually present, it is said, a soft, fair, flaccid skin, a blue eye and light hair; the outlines of his figure and his countenance will be rounded, and his upper lip full, tumid, and divided in the centre by a deep fissure. As my own opportunities for observation have been extended, I have been less and less disposed to place confidence in this scrofulous physiognomy, having met with very numerous examples of the disease in subjects of dark complexion, black hair and eyes, and coarse skin.

It is easy to account for the belief in the concurrence of the first set of signs in the case, when we remember that they describe the national or tribal characteristics of the Teutonic or Anglo-Saxon races, from whom we have taken the description, and who, from climate and national occupations, and modes of living, have been widely afflicted with scrofula. No region or nation, however, in the world, is free from it. Among us, its undisputed ravages, especially in the melancholy form of phthisis, are becoming more frequent in every successive generation, and although the negro is by no means free from its attack, the mixed race of mulattoes exhibit a special liability to it.

I have alluded to its successive developments, as somewhat connected with the age of the subject. Tubercle, of which I will by-and-by speak more in detail—tubercular formation may occur at any period; during the fœtal state, or as late as the sixtieth year of life. Cullen declares that "scrofula rarely makes its first appearance after the age of puberty," and I am much inclined to subscribe to the correctness of the remark; at any rate, if a child had evaded every development of the diathesis so long, I would indulge a strong hope that, with prudence, he might escape its influence altogether. The nature and phenomena of the local changes which thus occur in scrofulous subjects, have been carefully examined, and repeatedly described. The cutaneous eruptions appear earliest, usually at first papular, and then become squamous or crusty, invading the roots of the hair, and spreading over large surfaces. If one of the papulæ appear upon the adnata, a severe ophthalmia is excited; the cornea is attacked by ulceration, which is not generally deep or destructive, but healing slowly, leaves nebulous spots, or total opacity, behind it. A herpetic affection of the eyelids and eyelashes, sometimes engrafts itself very tenaciously upon this state of things, and, not unfrequently, a scabby inflammation of nose and chin, much resembling sycosis. The cervical glands are liable to enlargement and inflammation, in scrofulous subjects, and, indeed, it is this affection which is most familiarly known and recognized as scrofula—king's evil, as it used to be designated. Small, hard tumors are observed on the neck, which at first give no pain, unless when handled, but, increasing in size, impede the movement of the head, and may indeed enlarge so much as to interfere with both respiration and deglutition. The skin above them becomes tense and red; they at last soften, and ulceration gives vent to their contents, which, for the most part, consist of whey-like serum, with shreds or small masses of curdy lymph. I have, however, sometimes seen them discharge the most laudable pus that a surgeon could wish. These ulcers enlarge, and form ill-conditioned and troublesome sores, with edges of a peculiar dull red, or purplish color, very indolent and difficult to heal. When they do heal, they leave ugly cicatrices, the skin of which is ridged, and folded irregularly and wrinkled, so as to constitute a striking deformity. While some glands thus empty themselves and close up, others in turn swell, inflame, and discharge as above described—the process continuing, in some instances, not for weeks and months only, but even for years.

The morbid alteration of these scrofulous glands has been a subject of minute inquiry. At first, there is a mere thickening of their cellular structure, with an increase of the size and number of their nutrient arteries. A total change at last takes place, by slow degrees, in the substance of the gland, which is converted into the curdy fluid spoken of above, or a deposition of new matter of firm consistence takes place, caseous or tubercular.

Scrofulous inflammation does not confine itself to the lymphatic glands of the neck; similar tumors and troublesome abscesses are found in the thyroid, thymus, and parotid, over the sternum, in the ham, the elbow, and the groin. The constitutional irritation becomes serious in degree; hectic fever supervenes, and the patient sinks irrecoverably exhausted and worn out.

When the mesenteric glands become in this way obstructed and indurated, a long train of symptoms follow, which have been variously denoted by different writers, but most familiarly referred to under the head of *marasmus.*

Gregory was, I think, the first to recognize the cause with distinctness, and attribute to it the series of effects so often met with. It would be well if we would agree with him to employ the phrase in a limited sense, to designate this infantile complaint, as consisting in a primary scrofulous affection of the peritoneum and mesentery, with consequent disorder of the alimentary canal in all its extent.

Ayre, under this title, treats confusedly of the remittent fever of children, worm fever, cholera infantum, and even hydrocephalus. Good includes under the appellation, whatever distinct and unconnected affections, presenting as their prominent symptom, great emaciation, innutrition or atrophy.

Some have appropriated to our present topic the qualifying term, *atrophia ablactorum*, because it principally attacks children about the time they are weaned, or just afterwards, appearing to have arisen from change of nutriment. Such change may unquestionably excite or aggravate it, but it is not always to be evaded by keeping a child at the breast; whence we infer that it originates from spontaneous alterations and movements in the system, occurring about this time, as coincident with dentition. It shows itself in an infinite majority of cases, in the children of scrofulous parents; or where the parents have not exhibited any specific form of scrofulous disease, under circumstances where they and their offspring are obviously exposed to the influence of the agents formerly spoken of, as fostering the production or development of scrofula.

Marasmus comes on with general languor and paleness of the countenance, the bowels are irregular, often at first costive, but more usually irritated with a varying diarrhœa, from beginning to end, the stools being uncertain both in frequency and appearance. The tongue, at first foul, becomes clean and red, and after a time sore and aphthous, the whole lining membrane of the mouth, indeed, being superficially ulcerated with febrile disorder, thirst, and sometimes vomiting. There is remarkable emaciation, the flesh of the limbs being soft and flabby. The belly increases in size, being tense and tumid, usually tympanitic, or resonant on percussion; often, but not always, tender on pressure. The appetite is variable, often voracious, and subject to strange caprice; the skin, if there be fever, is hot and dry—otherwise, clammy and relaxed; not unfrequently giving off an unpleasant odor, and occasionally covered with anomalous eruptions. The respiration is hurried, the breath fetid, the food passes unchanged, the strength declines, and the poor little patient sinks into the repose of death. The length of time required to effect these changes, differs much in different examples; in some it is astonishingly protracted, when we consider how imperfectly the organs of supply have been performing their indispensable functions.

Dissections show the intestines empty and contracted in some parts, in others filled with thick mucus, or dark, ill-conditioned secretions; the liver, spleen, and pancreas, perhaps, firmer and heavier than usual; the peritoneum roughened, and its vessels injected; and the glands of the mesentery enlarged and indurated. I have seen these tumors in young subjects of tender age, attaining a prodigious size, not unfrequently of the bulk of an egg or a man's fist, and one such, little less than a child's head.

When the symptoms above detailed occur in a child whose parents are of known scrofulous habit, there can be no difficulty in deciding upon the nature of the case. They will sometimes, however, be met with in the offspring of those who have shown no marks of the strumous constitution, yet even here the causes are usually evident enough. "There is no difficulty," says Good, "in accounting for the atrophy which attacks children who are confined to the filth and suffocating air of a narrow cell—the common habitation of a crowding family—from Sunday morning to Saturday night; or are pressed into the service of a large manufactory, and have become part of its machinery, before they have learned their mother tongue."

Scrofula would seem to extend itself to the lower animals, which thus share in one of the curses of our race. Sauvages has admitted into his nosological system, scrofula chalasis, affecting the hog, and S. farcimen, the horse. In the latter, it has been ascertained, by positive experiment, to be propagable by transfusion of blood from a diseased to a healthy animal, and even from the horse to the ass—facts which we have on the authority of Prof. Coleman, of the Veterinary College.

It is important to know whether there are agents which can promptly excite into action the dormant tendencies of the strumous constitution, and arouse mere predisposition into open disease. Many circumstances are affirmed by writers to exert this power. Andral tells us that bronchial inflammation will develop pulmonary tubercle; but this I doubt in any other than a scrofulous individual. In such a one, I think this result highly probable, though even here, by no means certain; for, as far as is yet proved, tubercular deposition seems independent of obvious inflammation. Dyspeptic affections unquestionably serve to bring on strumous disorder in many of the organs. John Hunter affirms the same thing of lues venerea. It is asserted, too, of small-pox, and others of the exanthemata, to which list Stoll has added gout. Certain medicines are accused of similar effects, as mercury, arsenic, iron.

The *treatment* of scrofulous affections, on account of the obscurity enveloping the nature and history of the diathesis or constitutional condition upon which they are assumed to depend, has been conducted for the most part, upon empirical principles, or, I should rather say, upon no principles at all. Among the ancient remedies, a long and diversified list, we find recorded as effecting unquestioned cures, the blood of a mouse, lizards, the pressure of a man's hand who had been hanged, and above all, the royal touch, whence the familiar name of "king's evil," applied to the more commonly recognized form of scrofula.

The faith formerly reposed in these prescriptions, is not to be wondered at. Age, we have said, determines a change of seat, or development of strumous disease, and when the cervical tumors disappear, it is easy to ascribe their removal to the remedy last employed.

Whatever be the value of the pathological speculations which attribute scrofula to digestive derangement, the practice deduced therefrom is the most reasonable and useful. By keeping up as near as possible to the healthy point, the nutritive functions, it is clear that we shall best oppose, whatever be its nature, the progress of the disease, and preserve the constitution in the state best fitted for the removal and cure of its local manifestations.

It will be convenient to class the remedies employed in the treatment of scrofula, under the separate heads of alteratives and specifics, meaning to comprise within the former all such as are calculated to add to the tone of the organs of digestion, or to counteract morbid impressions in any manner made upon them, and thus improve the condition of the general system—and, under the latter, to include such as are alleged to exert a peculiar and special control over the particular morbid influence supposed to constitute the disease. It is to this second class that it has been customary to look with a hope and confidence, hitherto rewarded by no results of any gratifying import.

Under the first division of alteratives, the mercurials have had a prominent place. It has already been mentioned that some have accused them of developing and aggravating the disease, and the imputation is doubtless well founded, if urged against their harsh and irritating effects. The excitement of ptyalism has always seemed to me injurious; for which reason they should be taken in minute doses long enough to revolutionize the system, without salivating the patient. I shall hereafter speak more particularly of a combination in which mercury is aided by iodine and potassium. With these formulæ much may be done in favor of the scrofulous subject; but, I repeat, we must be careful as to quantity and effect.

Here I would next notice the purgative plan of treatment. No course of management has, on the whole, accomplished more for the scrofulous than this. If the cathartic selected be well adapted to the case, entirely unirritating, yet properly efficient, and its use persevered in patiently for a good length of time, we shall rarely fail to derive more or less advantage from it. I prefer, when we can obtain it, and when it is drank willingly, and without distress at stomach, pure sea water to every other purgative. Some children take very well the combination of rhubarb with an alkali and aromatic—aniseed and carb. potass. for example—and with undoubted benefit. The sulphate of potass. alone, in such doses as to move the bowels gently every day, is found highly applicable. The same is true of sulphur. The purgative mineral waters have, in this way, gained great repute. Alkalies were of old much used in scrofula, under the belief of the existence of an acid acrimony in the fluids. Whatever becomes of the theory, we may regard their utility as entirely established.

Tonics are to be spoken of in this connection. We may either exhibit them in combination with the cathartics above enumerated—a plan which I prefer, unless there be present a notable degree of febrile irritation; or we may postpone their administration until they are indicated by symptoms of debility. If the purgatives, however, be well chosen, and employed with prudent caution, we shall find the patient gain strength, flesh, and cheerfulness under their use. Dr. Physick, in his lectures, when advocating the purgative plan of treatment for morbus coxarius, used to dwell strongly upon the improvement in all these respects so frequently remarked during this course. Iron and bark are generally selected as the best tonics. The sulphate of quinine and the tinct. ferri acet. æther. are most applicable. The whole list of bitters may be resorted to.

Under this head of general remedies we may include the use of the baths, warm and cold, simple and medicated. We do not lay sufficient stress, it seems to me, upon the valuable influences of the warm baths. They determine to the surface from all oppressed internal organs, in a manner peculiarly salutary, and exert upon the skin a remedial action communicated, whether revulsively or sympathetically, to all the tissues of the body. If nothing more were done by them than the procurement of inevitable and perfect cleanliness of person, they would be invaluable.

The residence and apartment of the patient should be dry and well ventilated. His clothing should be warm, and well adapted to the season. He should be guarded against exposure to the vicissitudes of weather, and the changes of atmospheric temperature. His diet should be full, agreeable, and nourishing; but stimulants should be avoided.

Under the second division, of specific remedies for scrofula, we must again notice the alkalies. The chemical notions of the morbid acrimony supposed to taint the fluids, led to a persevering use of a variety of articles of this class. Burnt sponge attained great celebrity; shells calcined, hartshorn, and other animal matters, burnt, were much relied on. It is hard to say whether the more elegant formulæ of the present day are equally serviceable. We know what principles chemistry has extracted from these rude prescriptions, as the salts of potassa, lime, soda, and ammonia; but we know not exactly what she may have left behind. Perhaps the natural combinations of the several constituents of these substances may have been important; perhaps their empyreumatic condition, as usually exhibited, may have given them efficacy.

Although the analytical processes by which natural compounds are separated into their ultimate elements, are highly interesting, and promise not only to clear up much of the confusion so long clouding over the specific operation of our drugs, but even to add to the list of our most powerful medicaments; yet, I fear, we are in danger of being seduced by the neatness and apparent clearness of their results, into an excessive simplification of our practical formulæ. To exemplify my meaning, I need only refer to the discovery of iodine in sponge, and other marine productions, anciently in high repute for the cure of scrofula. To the alkali contained in these substances, was ascribed all their efficacy, and hence they fell into disuse, the more elegant officinal preparations of soda, potass., etc., being substituted for them.

Combinations of chlorine, with the alkalies and earths, have been highly extolled; the muriates, as they were called, of lime, barytes, and soda, are in best repute. The first named is proposed by Professor J. Hamilton, of Edinburgh, in his violent tirade against mercury, as a safe substitute (of equal efficacy) for this all-powerful alterative. I have no confidence in it. The chloride of sodium (common salt) is of very doubtful utility when given in its pure state. As mingled with the other ingredients of sea water, the excellence of which I have already acknowledged as a purgative, its value can scarcely be exaggerated. In a pint of sea water we find, it is said, about one hundred and eighty grains of this salt, with a small proportion of muriate of magnesia, some sulph. magnesia, and perhaps of lime. It is to the combination of these, rather than the effect of either singly, that I attribute the unquestioned benefit often derived by scrofulous patients from the persevering employment of sea water.

Some of the narcotics have been enumerated in the list of specifics, but without any just grounds. Their value as adjuvants cannot be impugned, but they act merely by relieving pain and irritation. I prefer to employ opium, which, indeed, I consider the most certain anodyne in existence; when any contraindication is opposed to its use, cicuta, hyoscyamus, or lactucarium, may be substituted.

Last, but not least, among the specific remedies for scrofula, we speak of iodine, already alluded to in a passing remark. This agent is a simple or elementary substance, found in the sea plants, anciently so much prescribed in the case before us. Its reputation, after some reverses, is at length fairly established; but in the earlier experiments made with it, so many instances of injurious results were detailed, as to point out the necessity of great caution in its employment. In fact, such ill consequences followed its indiscriminate administration in the region where it was first prescribed, that some of the Swiss cantons laid by law stringent restrictions upon its use. The mode of exhibition seems to me to be a point of great importance. As at first given, in substance and in strong alcoholic tincture, Magendie's mode, it is apt to prove irritating, and to excite fever and other annoying effects. I have abandoned these formulæ altogether, and confine myself to the simple aqueous solution advocated by Lugol, and necessarily very dilute, as iodine is so sparingly soluble in water, and the new preparation mentioned above, known commonly as the deutiodide of mercury and potassium. This latter I regard as a very valuable combination of remedies of special efficacy. Diffusing one grain of iodine in ℔ij of water, let the patient take a wineglassful thrice a day, or give him as often from six to ten drops of the deutiodide of the shops. Few stomachs will bear more than this, though the journals speak of twenty-five drops as having been taken. Some perseverance is necessary, if we would derive any benefit from these formulæ. If anything yet known can occasion or promote the absorption of a tubercular deposit, it is iodine; and almost every other form of morbid deposit, and every hypertrophy is, more or less, under its influence. I have little fear of its injurious operation, if exhibited as I have recommended; but it may as well be stated, that it seems sometimes to excite fever by a stimulant power, and occasionally produces a good deal of nervous irritation in constitutions of inordinate mobility. In such cases, I would lay it aside.

Its usefulness is not confined to its internal administration; it is much confided in also as a discutient in all scrofulous tumors when rubbed upon or applied to them. "It is almost incredible," says Coster, "how promptly the largest goitres have disappeared under this management;" and though I will not affirm that it is as constantly favorable in scrofula, yet it is certain, that scrofulous tumors yield sooner to the action of iodine, than of any other remedy known.

In regard to the local treatment of these affections, I offer the following remarks as the result of my own observation and experience: While the cervical tumors are indolent, and of moderate bulk, I prefer to let them alone. They are, in this condition, evils easily borne, and I am inclined to think with Parrish, that if the strumous diathesis is determined hither spontaneously, we cannot, by any interference, provide it a better location. This is probably revulsive, and may save the lung or some other internal organ or tissue.

When these tumors, however, enlarge without pain or inflammation, as they often do, attaining an inconvenient and distressing size, I would resort to iodine, externally as well as internally. If the skin become tense and red, we must desist from the iodine ointment, which is stimulating, and use saturnine lotions and soft poultices.

Leeches are often useful in subduing this inflammatory state of the glands; and the opposite or indolent enlargement may sometimes be benefited by the application of a blister, which gives efficacy to the iodine ointment. When fluctuation is perceptible, an emollient poultice should be advised to relieve tension, and solicit the approach of the contents to the surface. A small opening should be made early to prevent the formation of a ragged and deforming ulcer, and the lips of the wound kept in apposition to induce its healing.

The treatment of marasmus, as far as it exhibits itself in the symptoms of gastric and intestinal disorder, will be found detailed under the head of Cholera Infantum, to which I refer, with the single additional remark, that some of the practitioners of Continental Europe have affirmed that iodine may be used with great advantage, in combination with the other remedies indicated. My own trials with it, however, have afforded me no satisfaction. We must lay peculiar stress, in cases complicated with strumous tendencies, upon personal cleanliness, neatness, and perfect ventilation of the chamber, the choice of an elevated and dry habitation, free exercise, and an abundant supply of nourishing food.

Beneke, considered from his special attention to this topic as high authority upon it, lays very great stress upon what has been termed the "Whey Cure," and recommends an exclusive or almost exclusive diet of the whey from cow's milk in the treatment of the "Scrofulous Cachexia." "In by far the majority of morbid processes," he says, "we have to deal with an increase of the nitrogenous constituents of the blood," as in scrofula, tubercle, gout, rheumatism, &c. Whey is milk without its casein; it is best separated spontaneously, as it then retains all its salts; whereas, if rennet be employed, a portion of the salts, especially the phosphate of lime, will be absorbed by the coagulum. Twenty-four to thirty-six ounces of cow's milk whey is the average taken daily by a patient; this contains from 1⅜ to 2⅜ oz. of sugar.

The phosphate of lime is looked upon by him as an important element in the treatment of scrofulosis. Prof. Stone, of New Orleans, also regards this remedy as of great use, not only in scrofula, but in several other diseased conditions, not generally comprised under that head. These views receive strong confirmation from a late memoir by Mouries, reported on by Bouchardat, in which "the great importance of some inorganic principles in the phenomena of life" formed the topic of extensive research and discussion.

As iron was proved, by Lecanu, to be indispensable for the formation of blood-globules, and its defect is now known to be followed inevitably by anæmia or spanæmia, and chlorosis, so Chossat has demonstrated the essential necessity of the presence of phosphate of lime in the nutrition and growth of animals. To apply this principle to our immediate subject: Mouries alleges "that the food commonly consumed in cities does not contain the quantity of this salt which is required by nurses and pregnant women;" and hence he deduces an obvious explanation of the mortality of children in towns so much greater than that of country places, as well as of the imperfect health and variously cachectic condition of the survivors. "Mr. Mouries has sought to confirm his hypothesis by direct proof; he has examined the food consumed in cities, and shown that it exhibits a deficiency of one-half in alkaline phosphates. He has examined the milk of nurses, and shown that in eighteen countrywomen the proportion of earthy phosphates in the milk was at least twice as great as in that of ten Paris nurses, while in seven others, of the latter class, there was only a trace of phosphate of lime. He proposes a treatment in accordance with these facts, and administers to nurses and pregnant women as prophylactic or curative to the infants a certain amount of phosphate of lime—75 grains—daily mingled with their food. The result is stated as highly beneficial." (*Ranking*, 1854.)

We shall hereafter have much to say of the exhibition of the oils—of cod-liver oil especially, in tubercular phthisis. It is a matter of easy and rational inference to extend its employment to the management of tuberculosis generally, scrofulosis so inseparably associated with it, and indeed to all forms of cachexy. I confess, that without any very sanguine or enthusiastic confidence in the remedial powers of these various oily aliments, I would expect some advantage from their continued use. In every varied mode of cachectic deterioration of the constitution, we find one common fact, impoverishment of the blood. But both Simon and Thompson have proved that after taking cod-liver oil some time—and Thompson affirms the same thing of cocoa-nut oil—"the blood of phthisical patients grew richer in red corpuscles."

TUBERCULOSIS.

However closely related our present subject may be with that last treated of, I cannot venture to pronounce Tuberculosis so positively identical with Scrofulosis as to refuse it a separate consideration. There are some points of apparent and obvious difference, indeed, between them, which we shall notice as we proceed, and their importance is such as amply to compensate us for the time and space occupied in the discussion.

Tubercle, or tuberculous matter, is the most frequent of pseudoplasmata, or morbid deposits. It has been closely and extensively studied and examined, and is very variously described. In the condition most commonly met with and most familiarly recognized, it is a pale yellow or yellowish-gray substance, somewhat resembling cheese in appearance, soft and friable. It is inorganic or unorganized; it differs much in form, color, and consistence; it is found in minute granules and large masses. It is histologically undistinguishable from typhous and scrofulous matter. When examined closely, it shows the presence always of three elements: 1. A transparent amorphous, vitreous stroma, resembling micro-chemically coagulated fibrin. 2. Molecular granules, roundish, brownish, from inappreciable minuteness to $\frac{1}{800}$ of a line in diameter; some consisting of fat, some protein compounds, some calcareous salts, phosphate and carbonate. 3. Cells and cytoblasts imperfectly developed, with and without nucleoli, between $\frac{1}{300}$ and $\frac{1}{400}$ of a line in diameter. The proportion of these elements differs much in different masses. Chemically analyzed, tubercle is a protein compound with fat, extractive matters, pyin, and various salts, chiefly calcareous; some soda, perhaps.

While the majority of pathologists are content to consider scrofulosis and tuberculosis as the same morbid condition, a few contend earnestly for essential distinctions between them. Legrand dwells on the following points of difference: He denies to scrofula "the molecular element possessed by tubercle. Scrofula," he says, "is seated in the skin and periosteum, tubercle in the internal organs. While both impoverish the blood, scrofula destroys the inflammatory element, tubercle does not; hence it often complicates with the phlegmasiæ. Tubercle is incurable; scrofula often cured." Lebert says that tubercle is of peculiar form, seldom perfectly round; its outline is irregular, approaching sometimes the sphere, sometimes the oval, but generally angular and many-sided, with edges rounded; of a clear yellow with blackish tint; in the interior irregularly granular without a true nucleus. This "tubercle-globule" or cell, is the peculiar and characteristic element of tubercle. Bernard and Robinson describe these "tubercular corpuscles" as "bodies slightly irregular on the surface, containing no nucleus. They are polyhedric, sometimes elongated, but not flattened; their bodies dentated, and in the centre many granulations contained in an amorphous mass, very rarely rounded; their contour is well marked, quite dark. Water has no action on them; acetic acid .pales, but does not dissolve them; an important distinction, for all nuclei but those of cancer are rendered darker by it. Their structure is simple; an amorphous matter sprinkled with granules."

Preuss, whom Swett quotes as the highest authority, dwells on the casein element in tubercle as distinctive; but Vogel speaks quite contemptuously of this opinion. Recent writers are disposed to pay more attention to the relation of tubercle with fibrin.

It is in the seats they occupy chiefly that I find palpable distinctions between these three morbid products, so closely allied to each other. Typhous matter, Vogel tells us, is found "most frequently in the intestinal canal, between the mucous membrane and the muscular coat, in Peyers glands and in the mesenteric glands; less frequently in the spleen and lungs, and in and under the mucous membrane of the trachea." Scrofulosis attacks the skin and periosteum; the eyes, and lids, and lachrymal apparatus; the cervical and mesenteric glands—the latter one of the seats common to all three; the synovial membranes and cartilages—(white swellings)—and the vertebræ (psoas and lumbar abscess). Tubercle may occur it seems, in almost every part of the body, though Carswell regards the mucous and serous surfaces and the blood as "the exclusive seats of tuberculous matter." Vogel speaks of it as deposited "most frequently in the lungs and the lymphatic glands; but likewise in the kidneys, liver, spleen, mucous membranes, external skin, bones, and almost every part of the body." In some of these positions, however, it is rarely seen.

Tuberculosis differs from scrofulosis, and resembles typhosis in presenting itself sometimes as acute in its type or form. Rokitanski declares that "tuberculization may be either acute or chronic." Stokes and others of our transatlantic brethren, speak of rapid tuberculization, acute tuberculosis, as among the sequelæ of typhous fevers. Andral regards the deposition of tubercular matter in the lung as an effect of pulmonary inflammation. Bayle, Louis, and Leudet admit of an "acute phthisis," vulgarly called "a galloping consumption."

The forms or appearances presented by tuberculous matter, depend upon time, locality, and perhaps other contingencies. 1. Tubercle must be secreted in the fluid state; it is "deposited in interstices and moulded like mortar among stones;" Carswell maintains that it exists in the blood, though undetected. 2. Gray infiltration; moist, smooth, homogeneous, translucent masses of light gray substance, of the consistence of soft cheese in water, breaking readily under the fingers; in the lungs obliterates the air-cells, pervades parenchymatous tissues. 3. Crude tubercle—the common type: opaque, yellowish, lardaceous, caseous; smooth and polished when cut. Often described as the "second stage" of tubercular deposit, the last numbered being considered the primary form; both are primary, though the last may develop into this. In the former, the amorphous and cellular; in the latter, the granular element, prevail. Cruikshank, still followed by some pathologists, affirmed that "tubercle has three stages; when first deposited, it is a gray, semi-transparent substance; in a subsequent stage it becomes yellow, hard, and opaque, like particles of cheese; in a third stage it melts down into common pus." 4. Miliary tubercle, so called, consists of granules of from figseed size upwards, isolated or grouped in masses; irregular in shape and hue; gray, brownish, green, olive, yellow, reddish; the color I think hæmatic; Laennec and Morton say from pigmentum nigrum; Carswell intimates that it is melanotic. 5. Encysted tubercle: its existence is disputed; Louis says he has seen only one instance of it; Carswell thinks that tubercular matter is always moulded by and into the locality of deposit; Morton contends for its reality, and has "seen true encysted tubercle several times; the fibrous or cartilaginous envelop appearing to have a contemporaneous origin with the tubercle itself;" Gendrin affirms that "tubercles of the brain are always encysted," and Lugol, that "tubercles are generally covered with an envelop." 6. Colloid of Laennec, gelatinoid infiltration, described by Morton as "a rapid secretion, an albuminous œdema, a nearly pure albumen:" mucilaginous, rose-colored, or grayish, or olive, semi-transparent; it pervades the tissue. Laennec says "it soon becomes crude tubercle." There are other doubtful and confused forms which it is not possible always to distinguish from matters not truly tubercular.

In tubercle, no vessels or fibres are ever formed. Of the tissue involved the smaller vessels disappear; the larger ones are compressed and become impervious; the manner of its growth is hence obscure, and has been much disputed. Laennec contended that it increases by intussusception; but the opinion of Andral and Carswell prevails that it increases by the successive deposit of molecules around the primitive granule. "When deposited," says Morton, "each granule retains its appropriate tunic of cellular tissue." The deposition may go on until any cavity, such as an entire lobe of the lung, may be occupied.

There are two impressive and important changes which tubercles undergo. They soften or deliquesce; and this *softening* is a process of destructive tendency to all the surrounding parts. "A liquefaction of the amorphous stroma takes place; the cells and cytoblasts break up, and the elementary granules are liberated, forming an emulsion with a pre-existing or newly-secreted fluid," serum, or pus, saturating the tissues, which also break up into an organic detritus, seeking a vent like abscess, like it also sometimes resorbed. This process Engel regards as *quasi putrefactive.* Laennec and others contend that it always commences in the centre; a fact difficult to account for, and hardly consistent with the acknowledged inorganic condition of the mass. This central commencement is denied by Carswell, who says that it begins at the point of deposition, the secreting vessel changing its action. It does seem, however, that it begins within the mass at the centre, or in more points than one, an obscure event, which I think best explained by Morton, as the result of excitement of, and inflammatory secretion from the interstitial cellular membrane pervading it.

The *hardening* of a tubercle sometimes occurs, a process not properly restorative, but undestructive and of indolent tendency. The fluid parts diminish gradually; sometimes leaving a fatty degeneration; but more usually replaced by or abandoning a residue of calcareous granules, the remains being thus converted into a pulverulent mass, or a firmer chalky looking substance; or, more rarely, there may happen osseous transformation, a bony centre with radiating spiculæ. Carswell has seen tubercles in the mesenteric glands, "dry, cheesy, chalky; others firm and cretaceous; one, big as a hen's egg, like a mixture of putty and dried mortar; in the neck and under an old scar, small masses of hard cretaceous matter; in the bronchial glands the same sort of substance, hard as sandstone or bone, generally in a stellated form, with sharp irritating spiculæ." The locality is left, by the absorption of so much of the deposited bulk, wrinkled or "*puckered*," and the surrounding tissue becomes fibrous, dense, cartilaginous. This is the natural arrest of, or recovery from, tuberculation; and the occasional detection of this puckering in the lungs of subjects dead of other diseases is the foundation of the hopeful views recently taken by Prof. Hughes Bennett and others, as to the brightening prospects of the cure of phthisis pulmonalis.

Of the varied *seats* of tubercle something more may be said. This sort of pseudo-plasma may be deposited everywhere, or almost universally. Of organs, the lung is the chief; it is affirmed by Louis that it never escapes in tuberculosis, that is, when tubercular matter is found anywhere else in the body; but it is sometimes found in the lung alone. Of tissues, the mucous membrane, says Carswell, the cellular, say others, is the principal; the follicles, both of the respiratory and digestive tube: Prof. Horace Green designates the "laryngeal phthisis" of American writers, "Clergyman's Consumption," as it is often called, "*tubercular sore throat*," and describes it as being accurately a "follicular disease of the pharyngeo-laryngeal membrane, constantly attended with a secretion, either within the mucous follicles of a peculiar concrete substance resembling tubercle, or with an infiltration of this tuberculous matter in the submucous, cellular tissues." The serous membranes do not escape, either in the head, or the thorax, or abdomen; nor the glands nor the viscera anywhere. Carswell has found this matter in the lacteals and lymphatics; in the uterus and the testes; in the brain; and in the blood in the spleen; moulded everywhere, tubular or cylindrical, granular or lobular; soft when free, dense when packed; round when unresisted, as in cells and in the brain; "its form always accidental, its envelop the containing tissue."

Pathology of Tubercle.—We know not under what perversion of the nutritive function this deposit takes place—described as albuminous, gelatinous, fibrinous. Addison regards it as "consisting of colorless blood-corpuscles, which stagnate in the capillaries, and are converted into abnormal epithelial cells, accumulated and deposited." Baron, Kuhn, and Laennec thought it *hydatic*, *quasi parasitic;* semi-individually vitalized; growing from within. Duncan and Broussais attributed it to a morbid change in lymphatic glands. Morton, who says that each granule is separately deposited, enveloped by its own appropriate tunic of cellular tissue, does not show how this can possibly be consistent with his "rapid secretion, albuminous œdema," gelatinoid infiltration, so readily converted into the familiar "crude tubercle." Engel distinguishes "interstitial" miliary tubercle, from "infiltrated" tubercle. The first, he says, "closely approximates typhosis and scrofulosis;" the second, he regards as inflammatory.

This inflammatory origin of tuberculous deposit, contended for also by Andral, is not proved. There is no essential connection or dependence between them, though they may be coincident; tuberculous deposit may, in a strumous constitution, follow inflammation; it tends also to excite it. Tubercles are often discovered after death, when their presence had been unsuspected during life; they often remain indolent for long indefinite periods; they are rarely found exclusively in one part or tissue. Tuberculosis is a humoral condition; all the fluids of the body are probably inquinated, and from the morbid blood-plasma, impaired solid tissues must be derived; atoms imperfectly elaborated must be afforded by the nutritive vessels. It does not, however, depend, as typhosis and scrofulosis obviously do, upon poisoning or deterioration of the blood from some discernible external contingencies, imperfect depuration, bad air, innutritious or insufficient food and the like, but may supervene in subjects apparently under the very best hygienic conditions; the best fed, and clothed and sheltered. "When we consider," says Williams, "how many persons there are who carry cleanliness to excess, whose diet is most studied, whose every exercise is directed to health, and who nevertheless die of phthisis, it is plain that some secret and hidden circumstance remains to account for tubercular disease." It does indeed often develop itself most unaccountably: it is sometimes preceded by a previous attack of some acute malady; sometimes by a course of life in which fatigue of body or mental suffering are prominent features; sometimes without any cognizable antecedent of the most distant relevancy. It seems to depend upon, or to concur with palpable, organic, defective vitalization inherently; shown by some failure of functional energy; some defect in the depurative offices of excretion or elimination; some obscure perversion of assimilation; that wonderful, nay, almost miraculous and creative change by which dead matter taken into the system for its supply as food, is vivified, converted into active and living and normal flesh and blood. It is known to be of hereditary derivation, not only as a latent morbidity of constitution, but even as developed locally.

"A woman died of consumption in the last month of her pregnancy. Her body was examined after death, as well as that of the fœtus. Her lungs were found full of tubercles, some of which had suppurated and destroyed much of their substance. The lungs of the child were also studded with similar tubercles, some of which had suppurated."

"Another woman died of consumption a fortnight after being delivered of a still-born child. Upon examining the lungs, they were found, as in the preceding instance, studded with tubercles, some of which had occasioned abscesses in their substance. The lungs of the child were in the very same condition, and the kidneys also presented scrofulous tubercles." The morbid preparations referred to in these histories are to be seen in Mr. Langstaff's Museum, London.

The *prophylaxis* and *treatment* of tuberculosis are suggested by the views we have taken of its nature and history. The morbid constitutional proclivity, as far as it is cognizable at all, is displayed chiefly in its relations with scrofulosis. The causes which generate the diseased conditions must be removed, avoided, or counteracted with all assiduity.

The regimen and diet instituted should be such as have been already recommended under the head of scrofulosis, with an added suggestion which may deserve attention. In a recent essay offered by Dr. J. F. Churchill to the Academy of Medicine at Paris, he maintains that "the proximate cause, or at all events an essential element of the tubercular diathesis is the decrease in the system of its oxygenizable phosphorus." He proposes as "a specific remedy, the use of a preparation of phosphorus uniting the two conditions of being in such a state that it may be directly assimilated, and at the same time at the lowest possible degree of oxydation. The hypophosphites of lime and soda are the combinations which best fulfil those requirements." He administers them in the quantity of from 10 grs. to ʒj, in the 24 hours. Thus far I am not aware that these views of Dr. C. have received any support or confirmation; but in a case of so much intrinsic difficulty all rational suggestions deserve to be considered and fairly experimented with.

At the earliest suspicion of the development of the diathesis, and this should be most carefully watched in families where the hereditary tendency exists, the whole course of life, the whole mode of living should be changed in the most marked degree and manner. "The air in which a man grows sick," says Celsus, "is the worst air for him." The habits which are coincident with his loss of health; the occupation which he follows; his diet, his amusements—all these are to be regarded as concurring in some evil influence upon his system. If he has the energy and vigor to enter upon a course entirely in contrast, he may possibly evade the evil results which impend. A citizen must become a farmer and live in the fields; a sedentary man a laborer, or a traveller, or a sailor; must circumnavigate the world, or traverse the vast continents and deserts of Asia or America. It is thus, and thus only, that new stamina can be acquired, and a new and healthy constitution built up.

SECTION II.

DISEASES OF THE DIGESTIVE SYSTEM.

We come, next in order, to speak of the diseases of the digestive system, and shall include under this head, not only the morbid affections of the stomach and bowels, but likewise of all those parts and organs which concur in the reception of food, its solution and conversion into aliment, and the separation and expulsion of the portions rejected. That the animal body may receive its proper nutriment, the teeth must masticate thoroughly the food made choice of; the salivary glands must afford a certain amount of their peculiar fluid to lubricate the mass, with which the varied muscular actions of the tongue and cheeks must mix it intimately; the pharynx must receive and contract upon it; the muscles of deglutition must transmit it along the œsophagus to the stomach, in which it is to be dissolved by that wonderful menstruum the "gastric juice," far exceeding in its actual powers all that an insane philosophy dreamed of in its futile researches after the "universal solvent." The soft, pulpy chyme receives further elaboration by means of the pancreatic fluid and the bile, and in a state of close union with these, is subjected to the action of the lacteals, through which it passes, after a process which some regard as a progressive animalization or vitalization, others, merely as a mode of straining or purification, into the current of venous blood.

Of the numerous organs thus engaged in the business of digestion, it is difficult, nay, impossible, to point out in separate detail, the specific function of each. Some physiologists have chosen to speak of the stomach and small intestines as exclusively engaged in digestion, considered as a particular office; while all the other organs, which concur in the promotion of the general end, are regarded as collateral or collatitious; for example, the liver, the pancreas, and, more doubtfully, for its true office is as yet unknown, the spleen. The large intestines are something more than mere sewers or receptacles. The change in the contents of this portion of the tube is very remarkable and uniform; it is not perfectly understood how this change, which is termed fæcification is effected; it is known to be an essential coincident of healthy digestion.

Naturalists assert that the stomach is the organ most invariably met with in all the classes and varieties of animals. From this fact, it would seem to be very nearly, if not absolutely indispensable to the existence of this form of life; the hydatid, the lowest of the class, is all stomach, "et preterea nihil;" and in the highest, it exerts an influence as extensive as ceaseless. Its sympathies are almost indefinably powerful. With its tone, the whole system corresponds; it is, in a strong sense, as Dr. Kitchener calls it, "every man's master;" its demands require ready compliance; its morbid conditions imply discomfort and disorder everywhere throughout the system; "ventriculô languidô omnia languent." This universal extension of its morbid influences, when distempered, gives rise to many irregular, anomalous, and inexplicable phenomena, which have been much dwelt on by pathological and practical writers, and which, to our ceaseless annoyance, patients who suffer greatly, and are often much alarmed by them, are perpetually urging upon our attention for explanation and relief. A morsel of undigested food, or improper aliment, will, in one person, give rise promptly to a paroxysm of gout; in another, to a troublesome cutaneous eruption; and, in a third, to an oppressive dyspnœa. A blow upon the pit of the stomach will often prove instantly fatal; so will a large draught of alcohol and some other poisons; by what strange impression upon the sensorial and circulatory functions, it is beyond our comprehension to perceive. I might go on to multiply examples of this sort, almost without limit; as, when we have cramps from nausea and vomiting, extending even to the fingers and toes, and convulsions from worms, or from irritating ingesta, and the like.

It is well, too, to remember that these sympathies are reciprocal; that the functions of the stomach are impaired or interrupted in every general derangement of the constitution; that digestion ceases whenever any strong mental emotion is excited; that fatigue impedes it; that pain, from whatever cause, puts an end to it, when intense; and that all fevers, with scarcely an exception in any of their varied types, necessarily imply diseased conditions of this important organ.

DYSPEPSIA.

I shall place first on the catalogue of diseases of the digestive system, a morbid condition of the stomach, which, however familiar to the practitioner, the pathologist has always found it difficult to define. Under the term *dyspepsia*, we have become accustomed to comprise an extensive variety of troublesome symptoms which occur so often in connection with each other, that it seems reasonable to refer them to a common cause, and to regard them as resulting from the same morbid state of the organ primarily affected.

I would describe dyspepsia proper, as a *gastralgia* in which the functions of the stomach are not properly performed; and this brief definition, it seems to me, will include all that is necessary to a fair comprehension of our subject. The phrase is expressive of a definite disorder of the stomach; it is not synonymous with the word *indigestion*. The stomach under a great variety of morbid influences, refuses to dissolve or digest food taken into it; in fevers, it is common to see among the matters vomited in the early stages, articles of diet swallowed many hours previously. Mental emotion has the same effect, but the transient and symptomatic derangement of the stomach, which in these cases unfits it for the solution of food, differs notably from that condition of the organ of which we are now to treat, and which is among the most frequent of the diseases of civilized and refined life. Dyspepsia, when it occurs as an independent and idiopathic affection, is the result of an imperfect secretion of the several fluids, so important to the physiological and chemical changes of food taken.

The symptom most prominent, and most uniform, perhaps, is anorexia, defect or irregularity of appetite. This is often enhanced into nausea, more or less intense, and perhaps protracted for weeks without intermission; sometimes it is attended with occasional vomitings, either of the secretions of the stomach or of the food and drinks taken. As inevitably connected with this oppressive uneasiness, there is great depression of spirits, extreme languor, both mental and physical, a gradual emaciation of the body, and constipation, or an irregular state of the bowels. Many dyspeptics, however, enjoy, if I may thus misapply the word, a good appetite; nay, it is not rare to see them eat voraciously. But the food taken, either lies heavily on the stomach, or is thrown up acridly fermented, or passes into the bowels undissolved, giving rise to colics and cramps, and diarrhœa. The tongue is foul, with offensive breath and a disgusting taste in the mouth; there is a distressing sense of weight, tension and fulness of the abdomen; some complain of a perpetual dragging downwards of the bowels; there is frequently tenderness on pressure, chiefly at the epigastrium, and bands or ligatures cannot be borne on any part of the trunk.

Cardialgia, or heartburn, an annoyance which often follows any single attack of indigestion, is a very familiar symptom in dyspepsia. It is too readily assumed to depend of course upon the presence of acids. This is very commonly the case, no doubt, and the patient is troubled with eructations of a fluid, which sets the teeth on edge. But the fluids of the cavity diseased, though apt to fermentation, are sometimes alkaline, and besides these there are other irritants neither acid nor alkaline, which will induce heartburn; nuts and tobacco juice will do this.

Pyrosis, or water brash, a not unusual attendant on dyspepsia, consists in abundant secretion and ejection from the stomach and fauces, of a thin mucus, sometimes sour, sometimes limpid and tasteless; sometimes this is accompanied by nausea, but not uniformly. It is also generally, though perhaps not always, associated with *gastrodynia*, an acutely painful affection, which some attribute to spasm or irregular contraction of a portion of the muscular fibres, but which I am disposed to regard as properly a neuralgic symptom. The sensorial system rarely escapes sympathetic disturbance. Headaches of great variety present themselves; vertigo, very commonly; dim and imperfect vision, sometimes double vision; morbid vigilance, with or without light delirium; vapors, a species of mental delusion chiefly occurring at night, in which phantoms appear before the eye and are heard to speak.

The respiration is not unfrequently disordered; when we meet with asthma, or a form of recurrent dyspnœa undistinguishable from asthma; nay, Wilson Philip traces one of the varieties of phthisis to dyspepsia, as its legitimate source. The circulatory function is not apt to be affected, but may be variously deranged. Palpitation of the heart is occasionally complained of, and in some patients becomes so prominent as to arouse serious fears of organic disease. The pulse is, for the most part, natural; but may be very slow, and is often rather soft or weak. I have seen it, in one case, as low as 34 in the minute; in another, at 40; and, in a third, from 50 to 55 repeatedly. I have met, more than once, with a sudden and remarkable sinking of the pulse, coincident with great prostration of muscular strength.

In this long list, to which I might have made many irregular additions, I have not enumerated a single symptom which has not occurred under my own observation; and their singular diversity will serve, without comment, to exhibit the proteiform nature of this distressing malady. We are prepared then to anticipate the formation of a great variety of theories among the pathologists who treat of dyspepsia. Dr. Parry, whose pathological reasonings are always ingenious and plausible, attributes all the phenomena of dyspepsia to a mere fulness of the vessels of the stomach, a hyperæmia. Broussais, and a great number of others, confound it with chronic, or subacute gastritis. Barras regards it, correctly (as I have above remarked), as a mode of *gastralgia;* and Wilson Philip, dividing it into two stages, describes it as primarily an affection of the nerves of the stomach, which becomes, by protraction, a vascular or inflammatory condition. One of the most ordinary results of a continuance of dyspepsia, is the development of a chronic gastro-enterite, which is considered indeed by W. Philip as a second stage, and the symptoms of which are often, but improperly (as even by Parry himself) enumerated under our present head.

It is usual to speak of atony or debility of the stomach, as an essential part of the disease under discussion; but there has been little effort made to define the true meaning of the terms here applied, and the carelessness or obscurity of writers has caused much confusion. Neither with regard to this or any other malady, will I admit that the phenomena are satisfactorily to be explained by a reference to the mere increase or diminution of action or power of action in a part, an error which pervades the pathology, in succession, of Brown, Rush, Parry, Broussais, and numerous other inferior names. I do not doubt that, in dyspepsia, there is not only a difference in degree, but in the kind of action of the vessels, which results in a morbid alteration of the qualities of their secretions. The gastric juice of a healthy animal, dying suddenly, will dissolve the coats of the stomach in which it has been poured forth, and even out of the stomach, exhibits the most astonishing powers of solution, and will resist successfully all tendency to the ordinary chemical changes in articles subjected to its influence. But in the dyspeptic stomach, the plainest food will long remain undissolved, or will be melted down slowly and imperfectly, in the meanwhile undergoing the same fermentations and decompositions that it is liable to out of the body, though perhaps in a modified way. And here, perhaps, I should object, in passing, to the introduction of Pica and Bulimia among the phenomena or modes of dyspepsia. The former I look upon as a true cachexy—generally, perhaps, of chlorotic character. The irregular appetite is not for food, but for absorbent substances, which palliate, by some mechanical or chemical influence, the irritation of the morbid gastric secretions. Of this nature is the clay or dirt-eating of our malarial regions, which, at first the result of an instinctive craving, soon becomes an uncontrollable habit. Many women, subjects of the transient pica of pregnancy, take food freely, and digest it well. Such persons cannot be regarded as dyspeptics, whose irregular appetite is always attended with more or less difficulty and suffering when ordinary food is taken. Still less reason is there for considering bulimia under the head of dyspepsia—"canine appetite" being always, so far as I have known, connected with great powers of solution and assimilation.

In dyspepsia proper, there seems to be combined a number of elements, which must coexist in varying proportion and intensity, in order to produce the symptoms presented in different cases:—

1. The most prominent, as it is the most essential, is abnormal innervation. It is difficult to know whether we should place this first in point of time as primary, or consequent; cause, or effect. I have said abnormal, because I mean morbid innervation, which may be either defective or superfluous, but which is always specific in its nature. 2. Morbid condition of the vessels of the gastric surface. There may be either redundancy or deficiency of blood in the tissues of the stomach, anæmia as well as hyperæmia. 3. In either case, as the nervous influence is not acting regularly, we have depraved secretions. These also may be in greater or less amount than the average, but will be found always morbid. 4. There are many circumstances which go to show that the muscular or contractile powers of the stomach are impaired in dyspeptics generally, so that its peristaltic movements are not properly performed, and the necessary agitation and mixture of food with the gastric juices cannot take place. 5. To these, Todd adds, not unreasonably, the probable suggestion, that the absorbing power of the stomach is diminished, and thus the digestion of fluids rendered more difficult.

The steps in the process of digestion are as follows: 1. Mastication, or the minute division of food in the mouth, accompanied with 2. Insalivation, intimate mixture with saliva; it is then swallowed to undergo 3. Solution by the gastric juices within the stomach, where it becomes chyme; and 4, is passed into the duodenum, there to meet with bile and the pancreatic fluid, thus being converted into chyle fit for absorption, assimilation, and transformation into the blood, and the tissues, derived from it. In each of the fluids thus mingled with it there exists a peculiar agent, an organic matter of specific character and influence which exerts upon it, says Dalton, "a catalytic action, and transforms its ingredients into other substances." In the saliva this is called *ptyaline;* in the gastric juice *pepsin; chylopoine* or *pancreatine* in the pancreatic fluid. Of these secretions the saliva and the pancreatic are alkaline, and are supposed to convert starch into sugar, and to saponify fatty substances; in both which functions the bile and the intestinal mucus probably assist. The gastric juices are acid and prodigiously solvent, both in and out of the body; resisting ordinary decomposition and putrefaction, and changing all that they dissolve into a new substance, *albuminose*. By careful inquiry and observation, we may learn where lies the difficulty or impediment in the process of digestion. Saccharine, or starchy food, requires abundant saliva and pancreatic fluid; for the solution and conversion of albuminous, muscular, cheesy food, fibrin and gluten, the stomach must secrete normally and in due abundance; fatty food demands a full supply of pancreatic juice, bile, and the other intestinal fluids.

The *causes* of dyspepsia have been well divided, by Cullen, into the direct and indirect; the former acting immediately upon the stomach itself—the latter acting upon other parts of the general system in such manner as to disorder or derange that important organ.

The first of the direct causes of dyspepsia, which I shall mention, is imperfect mastication. Digestion may truly be said to begin in the mouth, the food being here comminuted and intimately mixed with saliva, which fluid was formerly looked upon as aiding in its solution, but is now regarded as principally, at least, a mere lubricant. Experimenters tell us that the mass of food in the stomach is gradually melted down by the gastric juices, the portions nearest the inner surface of the organ being first dissolved and pressed away toward the pylorus by the peristaltic motions of the organ. Hence, it is plain, that in definite proportion to the tenacity or solidity of the meal taken, will be the slowness and difficulty of its solution. "There is no person," says Spallanzani, "who has not, some time or other, been subject to indigestion from want of having duly chewed his food. I took two pieces of a pigeon's heart, each weighing forty-five grains, and having chewed one as much as I used to chew my food, inclosed them in two spheres, and swallowed them at the same time. Both these tubes happened to be voided together. Of the masticated flesh, there remained only four grains, whereas, of the other, there were eighteen grains left." The result of similar experiments, made by him with mutton and veal, was the same, and it was uniformly confirmed by the careful observations of Beaumont. Imperfect mastication is usually a matter of habit; it is, in our own country, the frequent consequence of excessive occupation and the hurry of pressing business; it is often owing, too, to decay and loss of teeth, whose diseased conditions are, indeed, supposed to be capable of determining dyspepsia, independently of the defective mastication which must attend their deficiency in number.

Excess in the amount of food taken, is a common cause of dyspepsia. This sometimes results from the influences just spoken of. Food not broken down and mingled with saliva, is but imperfectly tasted; the appetite, therefore, is not satisfied by the proper and natural impression on the gustatory nerves, and morsel after morsel is swallowed so rapidly and in such condition, that the stomach is overloaded and oppressed before satiety is induced; but satiety is our only physiological and instinctive safeguard against excess. Besides this, the art of cookery has always, in civilized nations, aimed as assiduously at the gratification of the palate as the nourishment of the body. Our dishes are carefully seasoned, and a nice management is displayed in graduating the excitement of an artifical appetite, by presenting, in regular order, a series of courses, each more tempting than the one which preceded it. Gluttony is thus made a scarcely less fatal mode of indulgence than intemperance in drinking, that *magna parens malorum*. It is worthy of particular remark, that dyspepsia seldom, if ever, originates from any peculiarity in the quality of food, however improper or deleterious it may seem. The human stomach is gifted with inconceivable powers of solution and assimilation. "The Hindoos live entirely on fruits and grain; the Tonguses on berries, the refuse lichen found undigested in the stomach of the reindeer, dried fishes, and beasts of prey; the Californians on rats, lizards, snakes, and wild herbs." Some hordes of nomade Tartars subsist chiefly on mares' milk, and the curds and cheese made from it; and the Esquimaux and other northern tribes, on whale-oil, blubber, and rancid fish, with raspings of wood. The influence of habit over the modes of life is proverbial, and almost omnipotent. Yet we perpetually hear certain articles in familiar use as food and drink, accused of causing dyspepsia specifically. The bread we eat, in all its varied forms of preparation; meats of every kind, however cooked; nay, milk itself, and the delightful infusions of tea and coffee, are thus stigmatized, how irrationally, we may decide at once. Of tea and coffee, the Chinese and the Turk, from whom we learned their use, seem to have failed to discover the alleged deleterious influences. It is possible that the high temperature at which we drink our tea and coffee may be injurious; but this is not clearly made out, and, moreover, their aromatic properties seem counteractive in a notable degree; for warm water, taken in the same quantity, and at the same times, has, in numerous instances, appeared to me decidedly injurious.

It is not to be doubted that the free or customary employment of many medicinal substances, with whatever views, ought to be enumerated among the causes of dyspepsia. Of these, the chief, perhaps, are tobacco, opium, and alcohol. I do not here speak of idiosyncrasies, upon which Cullen has laid more stress than they merit. He gives us an example in reference to tobacco, of an individual whose appetite would be destroyed for a whole day by a single pinch of snuff taken in the morning, and of another in whom snuffing regularly brought on pains in the stomach. I am certain that such is the tendency of all narcotics. It may be counteracted by vigor of constitution, and lessened by habit, yet few are so fortunate as to escape it altogether. The amount of quantity which can be borne is in inverse relation to the intensity of narcotic power; hence, tobacco and alcohol are less injurious perhaps than opium, in this particular mode.

Of the second class of causes of dyspepsia, those, namely, which act upon the stomach indirectly, through and by means of their effect on the general system, the number is almost indefinite. It is under this head that we must consider the sedentary habits connected with so many various modes of life, and so many occupations. The student who, with a happy but delusive forgetfulness of self, barters for intellectual improvement his physical powers of action and enjoyment; the indolent voluptuary, whose existence, for it cannot be called life, is spent either at the table or in bed ("du lit à la table, de la table au lit"); the imprisoned slave of commerce, chained to the counting-house, the ledger, and the desk; the pale artisan, whose heavily passing hours find him still seated at his work-bench—these are the fated victims of dyspepsia. The passions and emotions of the mind must next be enumerated here. Anxiety, when intense, stops the process of digestion as promptly as if the eighth pair of nerves were cut or destroyed; and the same may be affirmed of all the rest, in greater or less degree. Long protracted or very violent fatigue, loss of rest, the bad air of ill-ventilated apartments, sudden changes of climate, or even of temperature, and excessive venereal indulgences, are also to be mentioned. These produce dyspepsia in two modes, either separately or combined. They tend to exhaust the sensorial powers by an undue determination of it to particular organs or tissues, which are kept in action unduly; or they depress the tone, the vitality of the general system, which exhibits the effects of such depression early, though secondarily, in the organs of supply, the great channel of the restorative energies.

The terminations or consequences of dyspepsia vary somewhat with the predisposition of the subject, and the local and other climatic agencies which exert an influence upon him. It will readily be supposed that undigested food remaining in the stomach shall give rise to irritations of that organ, which may, under certain contingencies, become inflammatory. Thus we have a chronic gastritis aroused, a condition not unfrequent among dyspeptics, but exaggerated by Parry into the constituent or proximate cause of the symptoms, and regarded by Wilson Philip as a second stage of the disease which preceded it. This is an incorrect view of the matter, however: it is but one of a train of consequences, variable, incidental, and irregular. Diarrhœa is another of these, owing to similar irritation of the upper intestine by crude ingesta. Aphthous inflammation of the whole tube is sometimes met with, sometimes chronic hepatitis, and occasionally a true nephritis. But these are alike irregular and unessential. Malaria itself has not been accused of originating a longer catalogue of maladies than have been attributed to dyspepsia.

The *treatment* of dyspepsia need not detain us long, if it were in our power to communicate to our patients the disposition and the ability to follow out the few brief rules which we should lay down for their observance. There is no single disease recognized by nosologists so completely under our control: "Fling but a stone, the giant dies." Exercise and temperance are fully sufficient for the absolute renovation and restoration of the digestive function in dyspepsia proper; that is, while yet no organic derangement or structural lesion has supervened. But, unfortunately, a very large majority of our patients are incapable, however well convinced, of following our advice; and, of the few remaining, more than a moiety would turn a deaf ear to our exhortations. The student will not set a limit to the acquisition of knowledge, though made, as he is but too conscious, at the expense of his health, and ultimately of his very life. The idle sensualist cannot be spurred to exertion, but prefers the indulgence of his contemptible sluggishness. The poor artist and mechanic, though writhing under the pressure of pain and infirmity, cannot remit exertions on which depend their means of daily subsistence. Nor have we yet learned to "minister to a mind diseased," to calm the tumults of passion, to soothe into tranquillity the grief of the mourner, and the anxious fears of the distressed. We must, then, be content to palliate evils which we have not the power to shun or take away; and this, in truth, constitutes the purpose of the medical practice in dyspepsia. To the student we must prescribe hours of exercise; to the glutton, measured intervals and quantities of food; to the voluptuary, rules for the government of his headlong appetites; otherwise the continued application of the causes which have produced will perpetuate or renew the disease, in spite of all our remedies.

The dyspeptic, then, should sleep on a hard, firm mattress, rather than an ordinary feather bed; should avoid late vigils and rise moderately early. His breakfast should be a light one, and taken soon after rising, to fit him for his accustomed exercise or occupation. He should enjoy free access to the open air, and shun all close and ill-ventilated apartments. If urged by appetite, or prompted by an uneasy feeling of hollowness at the stomach, or debility, he may take a little nourishment at or about noon. His dinner should be moderate, and rather an early than a late one. If he can, he should follow the old maxim, "After dinner rest a while;" yet, unless specially feeble, I would not encourage any indulgence in the recumbent posture, or in sleep. The question as to the propriety of taking supper has been warmly discussed; but the answer seems to me an easy one. If there has been bodily labor, or active exercise after dinner, a slight meal should be allowed, otherwise not.

The term exercise, comprises a variety of modes, all of which tend to the same purpose. Frictions over the whole cutaneous surface, but particularly the abdomen, do much good by exciting the vessels and disposing to perspiration. If the bowels be pressed and kneaded, it is said to arouse their peristaltic action and relieve constipation. This was Halsted's method of treating dyspeptics, at one time so famous in New York. Playing with the dumb bells, swinging, leaping the rope, fencing, and other gymnastics, should be resorted to in bad weather. Riding in a carriage, and sailing, are of great service; but horseback exercise is probably most beneficial to the majority.

I have taken great pains to impress the principle, that the quantity of food and drinks is of much more importance than their quality. An intelligent dyspeptic cannot but smile at the efforts which have been made by acute and experienced physicians, to select particular formularies of diet for him. One prescribes an exclusive use of milk; another of broths and jellies; a third confines him to bran and water; while a fourth enjoins upon him the necessity of a resort to the most stimulating articles, as beefsteaks, with cayenne and brandy. In the midst of all this contradiction and uncertainty, it is difficult, but yet not, I trust, impossible, to lay hold of the definite truth. No two stomachs agree entirely as to the kind of food which deserves a preference. Habit exerts much control in this matter, and should always be attended to, and within certain reasonable limits may be allowed very great weight in our decisions. Beyond this, I will venture to lay down two rules—1. That no exclusive diet can be proper; and 2. That too great abstemiousness is as much to be shunned as excess. Without variety, the appetite palls, and the stomach depends so much, for its tone, on the influence of the gustatory nerves, that unless these are properly stimulated by sapid and desired food, the secretion of the gastric juice is both deficient in quantity and imperfect in quality. Hence we see patients emaciating and suffering under the milk diet, the rye mush, the bran biscuit, and even the ever-recurring beefsteak, which they have learned to loathe. A change arouses the nerves and excites the secretory vessels. As to the second point, stated above, I do not doubt the benefit of moderation, or even of occasional abstinence and total fasting; but, I fully believe, that infinite harm is done by the modern system of confining the patient to a measured amount of the insipid aliment allowed him. "Rise up from table hungry," says the philosopher. "Get an appetite," says nature, "and satisfy it." This can always be done safely, if the food be plain, moderately varied, not too highly seasoned, and masticated perfectly. We do not improve the strength of a feeble muscle, by forbidding it to lift weights, or give vigor to the intellect by abstinence from all difficult efforts. Sir W. Temple, I think, was the author of the quaint phrase, that "the stomach is like an idle schoolboy, always doing mischief when unemployed." A similar prejudice is embodied in the vulgar maxim, "to eat little and often;" unfortunately not confined to the vulgar only. Nothing so much wears out the powers of the stomach; and by preventing the possibility of a full development of the natural appetite or hunger, it keeps the harassed organ in a perpetual condition of sickly satiety.

I am very little disposed to enter upon the debates concerning the solubility or digestibility of various articles of ordinary food. I generally select for my patient, among the common materials of his accustomed diet, such as are not objectionable by any known property. I advise him to limit for himself the quantity or amount of each meal; to make the intervals between them as long as he can bear without faintness or other inconvenience; to chew thoroughly, and eat slowly, and to make frequent changes in his diet, avoiding the use of more than one or two articles at each meal. Among the received opinions on the subject of diet, are the following: Animal matters are more easily digested than vegetable; the flesh of those of mature age, than that of very young; meats roasted, than those prepared in any other mode; lean meats, than fat; fresh meats, than those which have been smoked, dried, salted, or pickled; eggs, raw or soft boiled; milk, and jellies, are also supposed to be readily soluble; so also the various mucilages. There are a thousand whimsical notions in existence concerning our breadstuffs. The Grahamites prefer bran to fine flour. The Scotch have much to say in praise of oatmeal. Good wheat, well raised, and allowed to cool thoroughly, or become a little stale, is unobjectionable. Corn, rye, and barley, make a very good bread, if well prepared. Rice is nourishing and light.

The Irish potatoe, when mealy, is both nutritious, and by common stomachs, digested without trouble. Once for all, let me protest against the idea of rendering our ordinary diet, in any mode or degree, medicinal. If hominy or rye mush, or wheat bran, prove laxative, the very fact shows that they are unfit for food; and so of all other articles. Let us keep absolutely separate the materia medica from the materia alimentaria.

As to condiments, which some so strictly prohibit, I am rather in favor of their being allowed. It is useless to discuss the employment of pepper and salt, for they must and will be employed. Salted meats and fish deserve to be considered in this relation, rather than as articles of diet. A slice of ham, for example, forms an advantageous addition, for the most part, to the breakfast of a dyspeptic. Many find mustard and cayenne of service.

Of drinks, "water is best," on every account, both for dilution and to quench thirst. Its temperature is a point of some consequence, as in warm seasons we are tempted to reduce it unduly. Iced fluids may become injurious if drunk in excess; lemonades, etc., as well as frozen confections, custards, and creams. Of tea and coffee I have already spoken. Wines and malt liquors, occasionally but not habitually, and in reasonable amount, may be taken without any injurious consequences. Ardent spirits I mention only to reprobate their use in any mode or quantity.

In health, they should find no place on our tables; and in all chronic diseases, they should be absolutely prohibited. The temporary relief, which they have occasionally afforded to dyspeptics, is infinitely more than counterbalanced by the permanent evil they have inflicted. We should drink very moderately at meals, and not dilute the gastric fluids by a deluge of any beverage. It is perhaps worth notice that man is the only animal who drinks while eating.

As to the medicinal treatment of dyspepsia, there is no degree of certainty. It has very generally been assumed that the most essential portion of the malady consists in a debility of the stomach, and that the remedies most distinctly indicated, therefore, were chiefly to be found among the tonics. After what was formerly said of the complicated elements which enter into the pathology of dyspepsia, there is no difficulty in accounting for the ill success, so much complained of, of the choicest and most powerful tonics, when administered solely with a view to their tonic influence. The precise modus operandi of this class of medicines we do not clearly comprehend, but we do know that it is by no means so simple an affair as was once imagined. The specific differences which they exhibit in their influence on the body, are very remarkable; it may be said indeed that they possess no traits in common. They cannot, therefore, be used promiscuously, but require to be carefully adapted to the particular conditions of the dyspeptic. The root of the holly, and the saracenia, eulogized by Porcher, have been thought very generally applicable as tonics.

No class of patients require so constant an attention to their symptoms, the consequences or effects of the morbid condition under which they labor. It is often essential, in the very first instance, to get rid of the crudities which have been allowed, on account of the torpid state of the digestive tube to accumulate in the stomach and bowels. For this purpose, an emetic is occasionally demanded, as when the tongue is foul, the breath fetid, and the stomach oppressed. A free dose of ipecac. will do good here, not only by the removal of offensive secretions, both upwards and downwards, but by the impulse given to the liver and secretory surfaces universally. We must not be led, however, by the transient relief afforded by the act of vomiting, to its too frequent repetition—an error common among the ancient Romans and, as we are told, the modern West Indians also.

Constipation is one of the ordinary attendants on dyspepsia, and many patients spend their lives wretchedly, in the constant use of purgative formulæ, which by their irritation and consequent exhaustion of the excitability of the parts acted on, increase the evils they are meant to relieve. The favorite laxatives are rhubarb, aloes and the blue pill. Magnesia will answer our purpose, when there is an abundant acid in the stomach, but should not be employed in too large an amount, as great masses have been found impacted in the alimentary canal. It is highly probable that a deficiency of acid, the hydrochloric or muriatic, which ought to be found in every healthy stomach in a definite proportion, is now and then a concomitant of dyspepsia. I prefer to enjoin upon my patient a regular and punctual effort at an alvine evacuation to be made daily, which, with proper attention to due habits of exercise, will rarely fail to remove costiveness. Next in order, I advise the occasional use of enemata of water, or, if necessary, of some more active material; a system much preferable to the use of cathartics. If after all this, they cannot be dispensed with, we must exhibit them at the longest possible intervals, and of the mildest ingredients. Many persons find a half grain or grain of calomel, taken over night, act gently next day. Others prefer a moderate dose of rhubarb with an alkali, the carb. sodæ, for example, and an aromatic, as ginger, mint, or aniseed.

If there be permanent uneasiness of the stomach, with pain at the epigastrium, increased on pressure, it may be well to institute a slow alterative course. Blue pill, in the small amount of a grain or two, or calomel in the dose of one-half or one-third of a grain, combined with an equal proportion of ipecacuanha, may be administered nightly until relief is afforded. Daubenton speaks highly of the latter article as an alterative and a tonic, when employed in these minute quantities. Under similar circumstances, advantage may be obtained from the application of cups or leeches to the epigastrium or abdomen.

Under this head of alteratives, I will here recommend the tris-nitrate or white oxyd of bismuth, which has also been recognized as a deobstruent and a tonic, and a sedative or anti-irritant. It is perhaps more generally adapted in the treatment of dyspepsia than any other remedy, and my own experience enables me to speak with confidence of its utility. I usually prescribe it in the dose of 5 grains to 10 or 15 ter diê. Dr. Handfield Jones recommends in cases of this sort the use of lactic acid, in the dose of twenty drops in half an ounce of water, to be taken with each meal. To supply other supposed defects of secretion in the stomach, pepsine, ptyaline, and pancreatine, artificially prepared, have also been proposed; and given, we are told, with benefit.

Gastrodynia, or simple pain in the stomach without heat or burning, may arise from a variety of causes. It depends sometimes on the mere distension of the organ by air evolved in its cavity. This is often relieved by aromatics, as mint, ginger, camphor; or relaxants, as tobacco smoked. It is occasionally so intense as to demand immediate relief by free doses of opium or other narcotics, which should, however, be avoided as much as possible. Fomentations may be laid externally to the surface with good effect, or a laxative enema given. It is here that I have seen most benefit from prussic acid, so highly but vaguely eulogized by Elliotson, who declares that it often acts "like a charm, giving instant relief." He begins its exhibitions with a single minim, which he increases pro re nata.

One of the forms of gastrodynia attends upon and seems to be terminated by the secretion of a thin mucous fluid which is thrown out from the stomach in large quantities by vomiting, or a movement similar to hiccup; and these symptoms have received the separate name of *pyrosis*, or water brash, which, indeed, Cullen, and after him Wilson Philip, regard as a distinct affection of the stomach. The fluid thus brought up is usually tasteless, though sometimes slightly acid; the patient suffers from thirst, and emaciates perceptibly, though there is, for the most part, no loss of the desire for food. I have met with pyrosis most frequently in women, as is also affirmed by Pemberton and others. I am unable to ascribe it definitely to anything notable in the mode of living, or in the diet or drinks of those subject to it. Percival suggests that the secretion may be from the pancreas; but this is mere conjecture. I have found the astringents of most service here; the preparations of iron are among the best, but cinchona, kino, alum, and catechu, have been administered with success. I have seen a few cases of pyrosis unconnected with gastrodynia, and apparently dependent upon other conditions.

Cardialgia is a well-known symptom, in which the suffering complained of is almost exclusively a sensation of morbid heat in the stomach, hence called *heartburn.* Generally speaking, it is dependent upon the formation of acid in the stomach, and attended by eructations so sour as to set the teeth on edge, and produce an acrid irritation in the throat and fauces. This is easily relieved for the time, by the use of alkalies, soda, carb. potassæ, magnesia, and lime-water. As it seems to be the result of fermentation, it can also be removed by the mineral acids. The vitriolic elixir, and the muriated tincture of iron may be taken for this purpose, and the latter, especially, is well adapted here. Cardialgia is not, however, exclusively a result of acid fermentation, as I have elsewhere observed; but may arise from varied modes of irritation. Some tobacco chewers are always attacked by it if they happen to swallow any portion of their saliva. Some dyspeptics suffer from it whenever they eat nuts—some from cheese, &c. These put an end to it by stimulants and aromatics. Some drink vinegar, and, as they affirm, with immediate relief.

Among the severest sufferings endured by dyspeptics is flatulency, which, indeed, is often unaccountably annoying. I have known more than one instance in which it occurred regularly after every meal, no matter how moderate, or of what article or articles of diet, beginning about an hour after eating, and continuing from one to two hours. In the worst of these cases it was strange to observe that a similar attack of flatulent colic took place, and with peculiar violence, whenever the habitual meal was abstained from or delayed. In two of the patients thus affected, after the total failure of purgatives, tonics, aromatics, and opium, the flatulence generally subsided under the moderate, but steady use of wine, Madeira, Sherry, and Lisbon, with everything eaten. The moderate and regular use of wine I have found serviceable in cases of continued nausea. This may be combated too by camphor, in small doses, with iron and with the oxide of bismuth.

The connection between physical and intellectual health, as pointed out in the old maxim, "mens sana in corpore sano," is nowhere more strikingly displayed than in dyspepsia. The mental dejection, the profound depression of spirits, which is so constant a symptom of the disease, proceeds very often into a gentle but gloomy insanity, and occasions, as I verily believe, a majority of the instances of suicide which from time to time strike us with horror. I speak with a personal and feeling knowledge of the subject, when I say that from this cause, life becomes an intolerable burden, the capacity for enjoyment being absolutely destroyed, and from a morbid increase of nervous sensibility, the susceptibility to painful impressions augmented an hundred, and a thousand fold. The unhappy patient, under these circumstances, ignorant of the true source of his unspeakable sufferings, fixes his fancy upon an infinity of imaginary evils and vain anticipations, and in the contemned name of hypochondriac, loses all claim to the sympathy even of his friends. Wearisome vigilance, or a troubled and unrefreshing sleep, dreams dark and heavy, or the suffocating nightmare, beset his couch; and the very thought of the long, long night, becomes a terror to him. Horrible shapes surround him, gloomy forebodings fill his ear, and the morning, which brings him a light and interrupted slumber, finds him languid and exhausted. The company and conversation of the day furnish him sufficient excitement to restore, in part, his powers, mental and physical, and at evening he attains a comparative degree of cheerfulness, until he retires, when the same succession of phantoms haunt his pillow and embitter his hours of repose.

In the more severe cases of this character, we must resort to the narcotics, lactucarium, hyoscyamus, and opium. Wine and camphor sometimes give relief. I have seen good done, apparently, by the infusion of soot, a favorite prescription of Dr. Physick and Professor Ives.

To the dyspeptic, perhaps, more than any other among the numerous sufferers from chronic disease, the various medicinal springs diffused over all regions of the globe, are valuable and useful. Of these there are two classes from which he may derive special advantage, the chalybeate and the mildly purgative. Both these appear to have their remedial virtues much heightened by impregnation with carbonic acid gas, a chemical agent fatal when introduced into the lungs, but grateful and pleasantly stimulating to the stomach. Common water, indeed, with which this gas has been combined by forcible pressure, is highly agreeable to most persons, and will often relieve irritability of the stomach, remove nausea and check vomiting.

The effect of the long-continued mild action of purgatives upon the constitution, as an alterative measure, has never yet been duly appreciated. We see it exemplified in that form of hydrocephalus which results from derangement of the primæ viæ, in morbus coxarius, one of the worst developments of the scrofulous diathesis, and in many other instances of scrofulous contaminations of the fluids, with or without marasmus. This happy influence is no less strongly exhibited in the case before us. We have *no officinal preparation of a purgative* which can be taken daily in an effective dose, *with impunity*, by the valetudinarian in chronic disease. But, for whatever reason, the Seltzer and Saratoga waters form an innocent luxury for the sound, while they benefit, nay, entirely restore the otherwise hopeless sick. These natural formulæ we imitate in vain; in vain we combine the agents which chemical analysis has detected in their composition. The quantities of iron, of iodine, of the various alkaline and neutral salts, and of the gases thus mingled, are so small, that some have considered the benefits derived as the results of mere dilution. But these results cannot be imitated at home, either by simple dilution, or by any artificial combinations. It has been made a question, concerning which I feel much indifference, whether the benefits obtained at the various watering places so much and so beneficially resorted to are derived from the specific virtues of the crystal well, or by the mere mechanical washing out, as some believe, of the primæ viæ and the excretory tubes, or as others maintain, and with more reason, by the exercise and agreeable society which, in such resorts, entice and amuse the invalid. I say I care not whether the restoration of health and comfort is brought about in either of these modes, or, as I am disposed to think, by means of them all collectively. It suffices to know that a few weeks' or months' residence at, and proper use of, these hygeian streams, has often given new life to the despairing dyspeptic; and that many a wretch, brought to their healing fountains a mass of disease, misery, and despondency, has returned home with a frame glowing with ruddy health, and a mind bright with cheerful anticipations.

GASTRITIS.

Gastritis, like other inflammatory affections, presents itself under two general forms, the acute and chronic; the latter being often met with in practice, while the former is rare. When we reflect upon the immense number and variety of substances, differing in temperature and qualities, mechanical, chemical, and specific, which are received into the stomach so frequently, and often in such quantity, and when we regard the close and extensive sympathies by which it responds to the impressions, whether natural or morbid, received upon every other part of the system, we are struck with a rational surprise, that so few instances of idiopathic gastritis should come under our notice. We can only account for such exemption, by a reference to the powers of resistance physiologically displayed by the principle of vitality against the influence of chemical and other extraneous agents.

Acute Gastritis.—Abercrombie says: "I have been often very much astonished to find, in my own observation, how seldom the stomach shows marks of inflammation, even when the organs most nearly connected with it have been inflamed in the highest degree." Broussais tells us that it never occurs alone, but always in combination, as a gastro-enterite. A far better authority, less biased, less wedded to preconceived opinions, far more accurate, I think, in observation—Andral, in his *Medical Clinique*—gives several separate cases.

It is readily recognized by the presence of severe pain at the pit of the stomach, with a sense of heat or burning, and intolerable oppression, nausea, and frequent and violent vomiting. After a short time, there is extreme tenderness at the epigastrium, with inability to bear the slightest pressure; the skin becomes hot and dry; the pulse is small and contracted, but hard, tense, and frequent; the tongue, at first covered with a white fur, becomes clean and red, especially at the tip and round the edges; there is much thirst, but everything taken is apt to be at once rejected, or occasions a sense of weight, and brings on hiccup. There is great anxiety and depression of spirits, with restlessness and sighing, and a peculiar and striking prostration of strength. "If the stomach is inflamed," says John Hunter, in his *Treatise on the Blood, Inflammation, etc.*, "the patient feels an oppression and dejection through all the stages of the attack; simple animal life seems to be hurt and lessened, just as sensation is lessened when the brain is injured; the pulse is generally low and quick; the pain is obtuse, strong, and oppressive, such as a patient can hardly bear." As the case progresses, the tongue becomes fiery red, and ulcerates, and the lips, gums, and cheeks, are hot, dry, and swollen; the fauces and œsophagus take on similar appearances, and deglutition is quite difficult. The pulse loses its tension, and is weak, threadlike, and undulatory; the eye is red and suffused; the bowels are often little disturbed, but usually, at first, constipated; they are afterwards irritated into diarrhœa; the mind is affected with low, muttering delirium; the matters vomited are very various—at first the contents of the stomach; then mucus, with a little bile, perhaps; and towards the termination, a diversity of morbid secretions, and not unfrequently "black vomit;" the extremities grow cold, circulation languishes, respiration becomes more and more difficult, and death terminates the sufferings of the patients, at a period ranging from a few hours after the first access of the disease, to three, four, or five days, or a week.

The *prognosis* in idiopathic gastritis of acute character is always doubtful or rather unfavorable. It depends somewhat on the probable cause which has given rise to the attack, and the previous condition of the patient. If it has supervened upon a chronic affection of any standing, there is great reason to dread a fatal issue. We are guided also in our expectations by the suddenness and violence of its access, the apparent rapidity of its progress, and the influence exerted upon the powers of life.

The *causes* of gastritis are ascertained without much difficulty. The acrid poisons, whether mineral or vegetable, are perhaps to be most frequently suspected, and a strict inquiry is demanded of us.

Mechanical violence from without, is enumerated by writers among the circumstances to which it has been ascribed—exposure to sudden and impressive changes of temperature; the inordinate use of several common articles of food and drink, ardent spirits especially; violent passion, or emotion of mind; and the metastasis of other inflammations, as the arthritic.

I once saw acute gastritis occur in every member of a large family, eleven in number, from eating a soup which had been kept and set on the table from day to day, until it had run into a state of incipient but obvious putrefaction. I suspected poison to have been administered, and on inquiry was shown this soup, which was decidedly offensive to the smell. Mushrooms, as all are aware, are often carelessly prepared as condiment or sauce, and mistakes occur by the substitution of the poisonous for the edible and innocent; the use of the former being followed by a severe and dangerous inflammation of the stomach.

When gastritis is not promptly relieved by the active employment of the proper remedial measures, it may run into the chronic state, to be spoken of by-and-by, or it may terminate in suppuration or gangrene, or end in death, without any local lesion of structure.

I have not seen any example of the termination in suppuration or gangrene described by authors; the fatal cases which I have met with having proved so in consequence of the general irritation and subsequent exhaustion, rather than by the production of any local structural lesion or injury. The occurrence of gangrene is inferred, when there has been sudden and complete relief from gastric pain with great prostration; troublesome hiccup; low delirium; cold extremities; countenance hollow and shrunken; the pulse is low, and the skin cold and clammy, and death soon ensues.

When suppuration has taken place there is considerable diminution of local pain, with rigors or shivering, and a sense of weight at the scrobiculus cordis; hectic supervenes, and the patient sinks somewhat slowly under the general irritation which attends, and the debility produced by night-sweats and colliquative diarrhœa; unless in a few fortunate instances, when, as is said to have happened, the abscess has opened into the cavity of the stomach, the pus has been evacuated by vomiting and purging, and the ulcer has healed sooner or later.

Autopsy.—The *post-mortem* examinations made and recorded, of the fatal cases of acute gastritis, have been few. They have shown the vessels of the stomach turgid, and the whole surface of the villous coat covered with a scarlet or deep crimson tint. In some it has been easy to peel off with the nail this mucous tunic; I have not found in any case either abscess or a single gangrenous spot.

Treatment.—The indications in the treatment of gastritis are obvious and undisputed. Our attention is called to the most prompt and ready means of reducing local excitement, and consequent general irritation. When any acrid matter or poisonous substance has been taken, it of course requires to be forthwith expelled; and if the spontaneous vomiting, which almost always occurs early, have not taken place, or have been insufficient to empty the stomach, an emetic must be immediately administered for this purpose, and the organ completely washed out with large draughts of tepid water. If the milder emetics of the vegetable class, as ipecac., will not act quickly enough, and a stomach-pump be at hand, I would without delay employ this valuable piece of mechanism, and cleanse the stomach thoroughly. This is far better than to place confidence in any of the chemical antidotes, which, however, are often useful, when by their union with the poison, they form an inert body. A stomach-pump, and a plain, well-printed toxicological table, should form part of the furniture of every physician's office, and every dispensary and hospital.

General bleeding has been supposed, by some, to be forbidden by the great prostration of muscular strength, and the low state of the circulation, the pulse being small and thread-like. But the powers of circulation are here oppressed, not depressed, that is, in the early stage of the case of which we are now speaking. The pulse will often rise as the blood flows, becoming fuller, softer, and less frequent. It will almost of course be cupped and buffy. Venesection must be carried to the utmost extent, that a due regard to the general condition of the patient will permit. Next in order stands topical bloodletting, which should in no instance be neglected. Leeches should in great number be applied to the epigastrium, and both the general and local detraction of the blood be repeated as often as circumstances call for it, and it can be borne. If leeches are not at hand, cups should be applied; but the former are preferable on account of the pain sometimes given by the cup at the epigastrium, where the slightest pressure is almost intolerable.

We now approach the debatable question, as to the employment of internal remedies. Those who take for granted the identity of all modes of irritation, and who conceive every impression, made by whatever agent, to be calculated to increase irritation, argue logically for total abstinence. "Water," says one of these writers, "is in some cases too stimulating." Others allow draughts of cold water, or bits of ice; and others still permit the use of mucilages. Some venture so far as to quench thirst with vegetable acids, but beyond this use no medicines. I cannot content myself with this passive supervision of the farther progress of gastritis of any other character than that which has been produced by the acrid poisons. In cases of this kind, I would assure myself of the entire removal of the poison, or by the use of antidotes, correct the deleterious quality possessed by it. Having done this, I might perhaps satisfy myself, when I had bled my patient generally and locally, to foment his abdomen and extremities, and give him ice and pleasant drinks, believing that the cause having been taken away, the effects would soon cease, or their violence, at least, decline. But where the disease arises spontaneously, as the phrase is, in an individual, in whom the predisposition has previously been built up, until some ordinary exposure to change of temperature or dampness, or some undue indulgence or slight excess has brought it into action, something more than the very proper and necessary preliminary measures above recited, will be required to save him.

Experience has shown, that at this juncture it is of great importance and striking advantage to determine to the intestines, and procure large and free evacuations from the bowels.· But the task is both delicate and difficult; and, in some instances, we shall scarcely be able to offer any formula of internal medicine, which the stomach will not reject at once. We must not despair, however. Castor oil will sometimes be retained by patients laboring under violent inflammation of the stomach, to whom, in slight indispositions, the article was always disgusting and emetic. Some will bear readily a simple solution of Epsom salts without any increase of nausea or gastric oppression. Calomel will generally be taken willingly and easily kept down, though it may not operate as quickly as could be wished; small pills of opium and calomel will hardly ever be rejected. Among these medicines tact and experience enable us to select, and we are abundantly rewarded for our assiduities by the improvement of the patient, as soon as they prove freely cathartic. They must be assisted, too, by the occasional exhibition of large laxative enemata. Perseverance in the use of these cathartics in sufficient doses and at proper intervals, so as to keep up free alvine discharges, has been followed, as far as my opportunities of observation have gone, by the most rapid and complete recoveries. The occurrence of ptyalism, during such a course, is a circumstance of highly favorable import, every unpleasant symptom receding rapidly at its approach, if this takes place at any period before the actual disorganization of the stomach, or the fatal exhaustion of the patient's strength shall supervene.

In some unfavorable examples, we are exceedingly embarrassed to find our patient sinking fast, from the very earliest access of his disease —the extreme debility and prostration to which his system has yielded, scarcely allowing us any opportunity for the efficient employment of the measures of depletion so obviously indicated. Few cases can be more hopeless, but we must not abandon our unhappy client in despair.

When we can no farther venture on the application of leeches or cups, we may foment the abdomen with warm poultices on which mustard has been sprinkled, while sinapisms are extensively applied to the extremities. Some prefer to lay on a large blister over the whole abdomen, and this measure is often serviceable after the first stage of the attack has passed.

In the meanwhile, we must give temporary support to the failing strength, by such stimulants as will add least to the local suffering and irritation. Turpentine is highly recommended by some writers, who advocate its employment in very large quantity—half an ounce, an ounce, and even two ounces having been administered at a dose. I will not deny its occasional usefulness here, but it has seemed to me better adapted and safer in the treatment of serous inflammations, as peritonitis, for example, than in those of the mucous tissue. Camphor will sometimes be of benefit if sheathed in a mucilaginous solution. Opium, in some of its forms, is always more or less available. Infusion of cinchona has been tried with advantage, and even the sulphate of quinine, in solution, has done unquestionable good.

Wine whey and weak milk punch may be added to the number of our stimulants, as conveying also some nutriment. Let me repeat that the employment of the stimulants, of which I have been thus speaking, is to be regarded as a measure altogether transient, and adopted to meet an urgent and temporary indication. We are not justified in resorting to them, unless it is clear and evident that the patient must sink at once and die, if left to his own energies. We must closely watch, too, the moment of earliest reaction, to diminish, and soon entirely abstain from them.

The management of the patient during convalescence will require much skill and judgment on the part of the physician, and on his own, not a little self-control. The function of the stomach is so much impaired by the attack, it is left so susceptible of irritation and disorder, that the nicest attention will be necessary not to disturb it. The mind must be kept quiet and free from care, the apartment well ventilated, the skin covered warmly and by woollen garments, and the diet for a long while strictly regulated in quantity, and in quality light and unstimulating, consisting chiefly of mucilaginous fluids, as strained gruel, gum Arabic water and arrowroot. After he is sufficiently recovered to take gentle exercise, we may indulge him with crumb of bread, milk, and broths of veal and mutton, avoiding spices or condiment of any kind.

Chronic gastritis is a disease of not unfrequent occurrence, occasionally existing for a considerable length of time without being suspected. It is one among the ordinary consequences of long-continued dyspepsia, with which the patient, and perhaps his physician, still confounds it. It is very frequently the cause of much of the sufferings of old drunkards, in whom, however, it is combined with such a number of complicated ailments—the necessary results of their brutal habits—that it is often overlooked. From the slow and obscure manner in which it is developed, it is sometimes impossible to trace with any confidence the source or origin to which we are to attribute it. The glutton and the sot seem to have an undoubted right to a malady, which forms so appropriate a penalty for their vicious excesses; but we meet with it also in the temperate, the prudent and the studious, and in delicate and refined women, whose whole course of life presents nothing to censure or correct.

I have spoken of the obscurity which often clouds over its commencement and progress; nay, it may proceed to a fatal termination, after causing extensive or deep ulceration of the mucous coat, without having been suspected. It would appear strange, indeed, that an organ of such sensitiveness, and of such importance in the animal economy, should labor thus under various kinds and degrees of inflammation without its having, in any manner, sensibly affected the constitution, or having discovered itself by any unequivocal symptoms.

Yet such, beyond doubt, is the fact occasionally. Pemberton mentions a patient, who died of some disease of the aorta, "in whom there was found a large scirrhus in the stomach, with an open cancer, which had made its way through the stomach and into the left lobe of the liver. Still, though this must have been a disease of long standing, the body was but little emaciated, and the subject had never shown any one symptom from which the presence of such an affection of the stomach could possibly have been inferred."

Dr. Hastings relates the case of a woman, "whose stomach, when examined, was found everywhere ulcerated, except at the large or cardiac end, which was healthy. The stomach had performed its functions to the last, and the state of the alvine discharges proved that the food had been promptly digested."

Circumstances, since known, render it probable that the inflammation and ulceration of the stomach, found on examining the dead body of the great Napoleon, had existed years before his banishment to St. Helena—perhaps the consequence of his early misfortune in receiving at Toulon, psora, or some other cutaneous disorder, and undergoing, for its removal, improper and injudicious treatment.

In general, we may detect chronic or subacute inflammation of the stomach by a sense of fulness or distension at the epigastrium, almost constant, apt to be increased after a full or stimulating meal, and by long fasting.

In the lighter shades of the disease, the patient is somewhat relieved and rendered more comfortable by a meal of proper quality and in moderate quantity; but when it is more severe and approaches nearer to the character of acute gastritis, all food occasions distress, oppression, and nausea. There is considerable extrication of gas; the thirst is troublesome; the tongue is apt to be smooth and fiery red, although it frequently retains for a good while its natural appearance; the appetite is irregular and depraved; the pulse usually small and weak; with some febrile exacerbation by night, exhibited in restlessness and jactitation, and a hot, dry skin; the strength declines, and the muscles are flabby and emaciated. Too much stress is laid upon the test of pressure applied at the pit of the stomach. This will sometimes occasion pain when there is no inflammation present; and will often fail to give pain, on the other hand, when the other symptoms which betray the disease, give notice that it exists.

The *treatment* is similar to that which has been detailed as adapted to the management of acute gastritis, with such modifications as are required by the less violent form and less rapid progress of this chronic malady, and the condition to which the system has been reduced during its development. General bloodletting is not often admissible at the late stage at which patients apply for relief, but topical depletion is almost always useful. Leeches or cups may be employed occasionally. Entire abstinence from food for a sufficient length of time, for the complete reduction of the morbid local excitement, would be impossible; but the mildest and most unstimulating nutriment must be selected. Mucilages are generally preferred, but in some patients they cannot be borne, as running readily into fermentation, and thus becoming highly irritating. I substitute, in such cases, diluted milk, soft boiled eggs, and thin broths, without any apparent inconvenience.

The bowels must be kept in a soluble state, and by the gentlest means; small doses of calomel, from half a grain to a grain, once, twice, or thrice a day, with or without minute addition of opium, should be given, and if the mouth becomes lightly affected with ptyalism, the patient will be usually much benefited. The alkalies are also useful here, whether by merely correcting an acid acrimony in the morbid secretions, or by some other quality, I will not attempt to decide. They seem often to act as tonics. In combination with rhubarb in very moderate doses, I have found the carbonate of soda highly serviceable; and, although it is not difficult to carry the system of purging too far in these chronic affections, yet under skilful direction it forms one of our most hopeful plans for their management. Some of the worst examples that I have known have been vastly alleviated, and some completely cured by a few weeks' residence at our watering places, Saratoga especially.

When the case has progressed to its latter stages, the mouth, cheeks, lips, and gums are inflamed and ulcerated. Deglutition is often painful, diarrhœa comes on, and dropsical swellings accumulate. Tonics are now indispensable, and of these iron, I think, has the preference. I prescribe the muriated tincture, sufficiently diluted, or the tincture æth. acet. Of the astringents, kino seems best adapted to relieve the diarrhœa, which supervenes, but it is occasionally offensive, and cannot be borne. I have frequently derived the most obvious advantage from the use of acetate of lead in small doses, and in combination with the tincture of opium or solution of morphine. The nitrate of silver is often serviceable here; it should be prescribed in moderate doses of from $\frac{1}{8}$ to $\frac{1}{4}$ of a grain per diem.

During this whole course of treatment the patient should be warmly clothed; frictions applied over the skin, the abdomen especially; and all exposure and imprudence carefully avoided. He cannot hope for complete convalescence or perfect cure unless he assume resolution enough for a total abandonment of all the bad habits of intemperance and excess, which led to the formation of the disease. Of these, as I have already said, the use of alcohol, in some mode, is but to apt to be the chief.

ENTERITIS.—Inflammation of the intestines claims fairly the next place in our course, as being very nearly allied to gastritis in history, causes and treatment. Indeed, as it is the same tissue which is affected in both, the inflammatory irritation is apt to be continued along the whole tract of digestive mucous membrane, constituting the gastro-enterite, so much written and talked of at the present day.

Acute enteritis comes on usually with pain about the navel, gradually extending over the whole abdomen, and alternating with intervals of ease, so as to be mistaken frequently for ordinary colic. The relief from suffering is, however, rarely so complete as between the paroxysms of colic, and the pain is attended with a sense of burning, and an indescribable general uneasiness, and prostration of strength. There is generally an inability from the first to bear pressure upon the belly, but this is by no means the certain diagnostic which some writers consider it. I have seen two fatal cases in which this tenderness on pressure did not exist. In one of them the patient usually replied to my question on the subject by kneading his abdomen forcibly with both hands, and telling me that he could thus excite a little uneasiness, and but a little. He died with extensive gangrene of the mucous coat.

In the second, I could detect no shrinking from pressure applied, and indeed sometimes thought there was the same indistinct relief given by it as in so many attacks of colic.

We draw the distinction from colic, farther, by observing, besides the comparative steadiness and constancy of the pain, the countenance, position, and manner of the sufferer. The countenance is expressive of intense anxiety and depression of spirits; he is dejected and desponding; he lies on his back for the most part, with his knees drawn up, and though he tosses his arms about, rarely moves his lower limbs or rolls upon his face. Some patients readily distinguish the pain to be different from mere griping, and they are soon led to remark, with great disappointment, that they obtain little or no relief from discharges of wind or alvine evacuations. The pulse, too, is early affected, becoming frequent and small; yet though much contracted, it retains, through the first stage, a degree of tension and hardness, discoverable on minute examination. There is nausea, with vomiting, and the matters ejected from the stomach assume a great variety of morbid appearances. I have several times met with black vomit in advanced stages of the disease. Constipation of the bowels is a common symptom at first; but an irritating diarrhœa is apt to come on towards the unfavorable terminations, the stools consisting of mucus with bile, of serous and ichorous effusions, known as resembling lotura carnium, and of black matter similar to that thrown up. As the case goes on the strength and pulse fail; the abdomen becomes tense and swollen, and exquisitely tender to the touch; the tongue is red and dry and smooth, or covered with small ulcers; the breathing extremely offensive, and the patient sinks rapidly with low muttering delirium.

Diagnosis.—Enteritis may be confounded with colic and peritonitis, from the latter of which, indeed, it is difficult to distinguish it; but this is a matter of less importance, as the indications of cure, and even the details of the treatment, are so similar in the two sets of cases. Peritonitis, besides, is rare except in puerperal women. It is usually associated with more marked abdominal tenderness, from the very first, and prompt tympanites; there is less prostration and nausea, and the bowels are more costive, and less irritated with tenesmus and morbid dejections. In colic, the pain is less fixed; there are intervals of ease more distinctly marked, the pulse is little, if at all affected, and more immediate and greater relief attend alvine evacuations and discharges of wind.

Certain special symptoms are connected with the particular localities of intestinal inflammation. Pain will often direct us; if chiefly fixed about the navel, it denotes *Ileitis; Duodenitis* is known by pain and tension felt deep in the right epigastrium; a swelling, intolerant of pressure, may sometimes be detected by the hand; it is apt to be protracted into the chronic form; when we notice an increase of pain between three and six hours after each meal, moving down towards the kidneys, and often ending in vomiting; then supervenes jaundice, and the stools will contain fatty matters sometimes, from the closure of the pancreatic duct; great emaciation cannot but attend.

Tuphlitis, or inflammation of the cæcum, is apt to become a prominent point in diffused enteritis, whether acute or chronic, but is especially often the chosen seat of the latter. It is known by the position; it is fixed in the right iliac region, which is sometimes swollen, always tender on pressure. Colic-like pains, commencing there, pass up along the ascending and transverse colon, and down into the pelvis, and along the right thigh—sometimes both thighs, and into the groin, with retraction of the testis. The pain is increased in the erect posture, and when lying on the left side; the patient is easier on his right side with his knees drawn up; the pain is, also, increased whenever the bowels are acted on. The surrounding tissues become involved, and the suffering extends and increases, especially when the appendix vermiformis is inflamed. In general, an irritating diarrhœa supervenes. Sometimes, however, impaction of feces takes place, which Wunderlich calls "Stercoral Tuphlitis." The suffering of the patient is intense; there is a deep-seated, hard tumor at the part, constipation, sometimes with urgent tenesmus, small discharges of solid, hard feces being effected with great effort. If relief be not afforded, invagination, and ileus, with or without gangrene, exhaustion, and death, must soon ensue.

Colonitis is said to be almost as common as ileitis: Barthez and Rilliet found it in half their autopsies of children. It is said to be more common in women than in men. Hare thinks that many of the pains ascribed to the stomach are located in the transverse colon.

Autopsy.—Like gastritis, enteritis brings on the fatal termination in many, if not most instances rapidly, and by its oppressive influences on the general constitution, and the local lesions may not be very remarkable. They consist chiefly, in such cases, in engorgement or congestion of the vessels of the mucous intestinal membrane, the ileum, among the small, and the colon, about the sigmoid flexure, of the large, showing most this condition. The membrane is softened, usually in proportion to the discoloration, but I have seen it deeply reddened, as by infiltration, without notable softening. It is, on the other hand, sometimes pale and soft, as if macerated. Ulceration occasionally occurs, though this belongs rather to the chronic than the acute form. It may attack any portion of both large and small intestines. I have met with two instances of extensive gangrene of the colon and rectum. In two other examples of tuphlitis complicating renal disease, there was extensive adhesion, thickening and induration of the intermediate tissues, and in both the cæcum and the appendix were deeply ulcerated.

The ordinary post-mortem appearances, described by writers, are: "Hyperæmia in spots, with swelling and softening of mucous tissue, frequent plastic pseudo-membranous exudations in rings round the bowel, follicular inflammation with ulceration, beginning with swelling of the follicles in form of nodules, splitting and forming ulcers with jagged edges, sometimes perforating, sometimes found in all stages of reparation, sometimes, probably, healing without any trace."

Two remarkable instances of the formation of abscess have occurred in the practice of my friends. In one the bursting of the abscess with sudden gurgling, was heard by the patient and his parents, yet gave no pain. He died the next day, the matter being effused into the peritoneum. The second was a case of long and intense suffering; recovery at last took place, pus finding its way into the intestines, and being discharged. I have not myself witnessed anything that I could regard as the formation of gastric or intestinal abscess. I have met with many attacks of mucous inflammation of the digestive tube, of or approaching to the character of dysentery, in which the discharges contained purulent matter variously mingled.

The *causes* of enteritis have been already enumerated as giving rise to gastritis. The former proceeds, however, more readily from exposure to changes of temperature; cold applied generally or locally, as to the feet, or by means of wet garments or damp bed clothing. It may arise from the mechanical irritation of some sharp or hard substance accidentally swallowed. In one of the cases above alluded to, a cherry-stone was fixed in the appendix.

In the *treatment* of enteritis, we are to be guided by the same principles laid down for our government in relation to its kindred malady. The lancet must be employed boldly and freely; and in the first stages of the attack, if the diagnosis were clear, I should scarcely be deterred from venesection by any inferences drawn from the state of the pulse. I would rather bleed if it were even experimentally, and carry this mode of depletion as far as possible, nor tie up the arm until it became unavoidable, from the occurrence of syncope, or other sensible effect of the loss of blood.

If resorted to early, and with proper caution, venæsection is unquestionably the most valuable and important of all our remedies.

We must, of course, beware of the vague, empirical, I may add, desperate manner, in which it has been employed by some practitioners, who have not seldom carried it so far as to sink irrevocably the powers of the constitution, and procure, or at least hasten obviously, the fatal end. The blood is usually cupped and buffy; indeed, I have seen it separated into lymph and cruor, while flowing from the vein, so as to present a streaky or purulent appearance.

Topical depletion comes next in order, and we shall very rarely fail to derive from this means of relief, definite and striking advantage. Large numbers of leeches may be applied from time to time, or the cups repeatedly put on. Nor should we fail to use the lancet as often as the pulse rises, and until the inflammatory excitement is fairly subdued. The danger is urgent, the indication clear and indispensable; we must act with prompt and unhesitating decision, tempered by prudence and cautious foresight. Some disputes have, of late, arisen as to the proper applications to be farther made in this case, and some few practitioners of the (so called) physiological school, have been bold enough to lay ice upon the abdomen. I adhere to the established principles and practice of revulsion, and prefer the persevering employment of warm poultices and fermentations. These encourage the free oozing of blood from the leech-bites and scarifications made, while they promote derivation from the internal surfaces, and relax tension and soothe irritation.

It has been long since a contested question, whether in enteritis, purgative medicines are more liable to do good or harm, and many physicians, both of the old and new schools, have affirmed that they must necessarily add to the existing irritation and inflammation. However plausible this may seem, no prejudice can be more ill-founded, nor do I consider any point in practice better settled than the importance and propriety of the administration of purgatives in the case under consideration. Nay, it is asserted in round terms by one of the most respectable of modern writers, that "if, in the course of a reasonable time, free feculent discharges can be procured from the bowels, the pains will gradually diminish, the pulse abate in quickness, and the patient be in the way of recovery, and that the cure almost entirely depends upon our success on this point." I would not, perhaps, express myself so strongly on the favorable expectations thus conveyed, nor would I advocate the promiscuous employment of all or any of the articles known as cathartics. On the contrary, a very careful selection is necessary; the severe and drastic are to be absolutely prohibited, and the most gentle must be chosen; and, fortunately for our purpose, the milder the laxative prescribed, the more efficient we shall probably find it. Castor oil, if it can be retained, deserves a preference. A simple solution of Epsom salts is often unobjectionable, and if not itself active enough, will admit of useful combination with rhubarb, or may be alternated with proper doses of calomel. This latter must be resorted to when the nausea is great, and the vomiting frequent. It will rarely be rejected, and deserves our confidence in almost every variety of case. I would persevere in its employment till ptyalism had been induced, unless, indeed, the patient be previously restored to convalescence. If it proves too actively laxative, small additions of opium are called for, and do good service. Should the constipation prove obstinate, as sometimes happens, we must assist the action of the above remedies, by the administration of enemata, and these, also, should be of the mildest and most unirritating efficacy. It will rarely, if ever, be necessary to have recourse to the mixtures which have been sometimes recommended of tart. antimon., tobacco, or turpentine, these being rather adapted to cases in which the obstruction is properly or exclusively, as I shall hereafter describe, of spasmodic character.

When the patient will no longer bear even topical depletion, and the effect of the fomentations above described seems to have been diminished by their continuance and familiarity, we must, on the same principle of revulsion, blister the whole abdomen. Epispastics are also with benefit laid upon the upper and inner part of the thigh, on the calf of the leg, and on the wrists and ankles. They are, in these low stages of internal inflammation, of service, too, by acting in an unobjectionable way as stimulants.

The pulse still sinking, and the powers of life failing more and more, we are recommended by many authors to the exhibition of the spts. terebinth., either with castor oil or in emulsion with mucilage. It is eulogized as an admirable remedy, in this low and almost hopeless condition of things, checking the troublesome hiccup which is often present, restraining the violent and exhausting vomiting, diminishing the pain, and subduing, as if by a charm, the inflammatory symptoms. We should recollect the analogous administration and high praise of it as adapted in the treatment of the last stage of yellow and typhoid fevers.

There is a singular circumstance noticed by some writers as recurring in this disease, of which I myself have witnessed a remarkable instance; and it deserves attention as being calculated to sustain our hopes, under the most unfavorable appearances, "that even in the extreme moment of a seeming mortification, a sudden revolution takes place, and stools are evacuated, and this, too, after the extremities have begun to grow cold, and deadly languor is overpowering the frame." Here we must seize the opportunity to rouse and restore the sinking powers of life by the timely application of nourishment and stimulants, judiciously chosen.

A very old negro fellow, under my care, had sunk into this state after an illness of three days, during which I had attempted in vain to procure any alvine evacuations. He was prostrated to the lowest point, his pulse feeble and thread-like, his countenance haggard, his extremities cold, and his belly tumid and excessively tender. There was a sudden relief of pain, which I attributed to the supervention of mortification; he had next an inclination to stool, and his bowels became loose. Stimulants were resorted to without delay, and he recovered.

Of *chronic enteritis*, little is necessary to be added in this place. Its existence is known by the same symptoms which mark the acute form, but in far less striking and obvious degree; and it often goes on to ulceration, without its having shown itself by any unequivocal signs. The treatment is very similar to that recommended in chronic gastritis, with which, indeed, it is almost invariably connected. It arises from like causes, and runs on to the same terminations with like lesions.

It belongs, besides, to the history, and follows in the train of a great number and variety of intestinal and visceral diseases; in which connection it will call for further and more detailed notice.

It is important that the patient having been once attacked by enteritis, should be extremely careful to avoid its recurrence, for there is, perhaps, no disease which leaves behind so strong a tendency to return and be re-excited. And such relapses are in the highest degree violent and dangerous. The clothing should be warm, the flannel roller being worn around the belly, the diet light and unstimulating, though nutritious. If the means of the subject allow it, a proper change of climate should be made from time to time, so that he may always enjoy a summer temperature, and free exercise in the open air made habitual. The mind should be kept as far as possible free from care and anxiety, and all prudence displayed in avoiding such food, drinks, and exposure as may give rise to an attack of indigestion, which would inevitably be followed by acute gastric and intestinal inflammation.

Milk Sickness.—This is the proper connection in which to speak of a singular form of disease, known exclusively, so far as I am aware, in the southern and western States of our Union.

The fertile valleys, or deep rich coves among the mountains of Kentucky, Tennessee, North Carolina, and Georgia, are subject to this singular malady, neither the nature nor the cause of which is clearly set forth in the few monographs which have appeared in the journals concerning it. Some attribute it to the ordinary malaria, which before and since the time of McCulloch has been supposed capable of originating every malady on the long catalogue of nosologists. Others, it seems to me with more reason, have ascribed it to some known or undiscovered vegetable poison, confined in its growth to the spots above alluded to. Others still look upon it, reasoning from analogies of symptoms, upon which they found their opinion, as the effect of mineral exhalations—perhaps of lead, or sulphur or arsenic.

Whatever be the cause which gives rise to it in the lower classes of animals, it would seem that it never affects, directly, the human subject. Man is not attacked by the disease unless after eating the flesh of herbivorous animals exposed to receive it, or using the milk or butter obtained from them. Other carnivorous animals are also liable to be attacked in the same way, if they eat of the diseased flesh. This exclusive liability of the herbivorous classes appears to me to favor the hypothesis of its vegetable origin. The cow and the horse are most frequently its victims.

It derives its name from the fact that, when occurring in the human subject, it is most frequently met with as the consequence of eating milk rendered poisonous by the diseased condition of the cow from which it was taken. Butter made from such milk, is still more acrid, and the flesh of the animal, even when cooked, more strongly poisonous than either. It is fortunate that the localities in which it resides are capable of being defined accurately. Such places are often kept carefully fenced in from the intrusion of cattle, whose milk is then unhesitatingly used. The beautiful valley of Jocassa, in the neighborhood of the White-water Falls, in the upper part of South Carolina, was one of these spots, and cattle were not allowed to range beyond certain well-known limits. The cultivation of soil, which has been known to produce it, seems to deprive it of this deleterious quality. If animals be kept within their inclosures till late in the forenoon, when the dew is entirely exhaled, and driven home again early in the evening, it is said they escape injury, even if allowed to feed within the known limits of this poison. It usually affects animals as a chronic disease, but sometimes attacks with great violence and rapidly proves fatal. My guide to the cascade above mentioned, informed me that a valuable horse, belonging to a neighbor, which had strayed upon the dangerous ground and fallen sick, died before he could cross the mountain and return. He had gone to bring a dose of bear's oil, considered there a specific, and lost no time, but was too late to save the life of the poor creature. The incapacity to bear exercise is said to be so complete a diagnostic, that the owners of cattle give them a hard drive before killing them; this excites the disease infallibly if latent in the system.

I have heard so much evidence from medical men and others in the very neighborhoods which it is said to infest, that I cannot withhold my faith in its distinct existence. Yet in a late paper (May, 1852), Professor Yandell urges some strong reasons against the validity of the common and wide-spread opinion. They are as follows: The symptoms are differently described by the authorities. The localities vary exceedingly in every respect. It may occur at any season of the year; and the contingencies under which it happens, present extreme diversity. All this may be very true, and yet like malarious fever, the disease may really exist, and have one undefined cause. But some of the negative and some of the positive facts alleged by him must be admitted to possess great weight. Thus, the most experienced and industrious botanists have failed to find in the most poisonous locality any new or unaccustomed plant; mineralogists discover nothing in the soil that can account for the phenomena—nor is there anything injurious detected in the water of these places. Besides this, "cows feeding upon blue-grass pastures destitute of all other vegetation, have suffered from it; and one cow died of it that had been turned into a naked lot and fed upon corn meal."

In the last volume of the *Transactions of the Am. Med. Association* for 1858, we have a "Report on the Epidemic Diseases of Kentucky," from the able pen of Dr. Sutton, evidently favoring the sceptical view of this obscure and much disputed topic.

On the other hand, the authorities are numerous. The distinguished Dr. Drake may be mentioned among those who have yielded themselves to the general belief in the existence of such a specific disease. After extended and patient inquiry, he arrived at the conclusion that "the popular opinion was highly probable," which assigned the rhus toxicodendron as the cause of the epizootic.

Dr. Dickey regards the diagnosis of milk-sickness as entirely clear, and offers a description of the anatomical lesions produced by it. In animals "the stomach and intestines are inflamed, and the mucous coat destroyed; the entire tissue is in some parts gangrenous, dark, or rather of black color, the tissue easily broken through. In the ventriculus, or paunch, and indeed throughout the whole channel, is found a substance conglomerated and resembling in appearance balls of cemented sawdust, some of which are loose, and some perfectly adherent to the gut."

In a man who "had prior to his death all the usual symptoms accompanying milk-sickness," he found the "peritoneum strongly inflamed and gangrenous; the larger curvature of the stomach injected, of a bright pink hue: the mucous coat much destroyed and deprived of its epithelium, there being an appearance of having suppurated throughout its whole surface. Its veins were also highly injected. The duodenum was in much the same condition as the stomach; Brunner's glands were enlarged and red but not ulcerated. In the jejunum and ileum, the mucous coat was easily peeled by the finger nail. Peyer's patches were ulcerated. The colon in some parts pale, in others gangrenous. Ramollissement of substance of liver was noted; the gall-bladder distended with sticky inky fluid; the spleen enlarged and grumous."

The description given of this disorder from various sources leads me to the belief that it is a form of gastro-duodenitis or extensive gastro-enteritis, to whatever cause we may be led to ascribe it.

Languor and lassitude are among the earliest symptoms of the attack, soon followed by nausea and vomiting, with great oppression at the epigastrium, and pain with a sense of heat and burning at the stomach. The thirst is great—the skin becomes hot and dry—the eyes are red, suffused and glassy, and, as some say, a peculiar odor is exhaled from the surface. The pulse is affirmed by some to be little changed from its ordinary condition; while others maintain that it exhibits a frequency and tension resembling that of typhus fever, to which indeed this remarkable disease, after the first stage is passed, presents a striking resemblance. Patients recover slowly and imperfectly, remaining long after, and perhaps for life subject to indigestions and other complaints of the stomach.

There is as little agreement among those who have written of its *treatment*, as there is in the discussions concerning its cause. I have already alluded to the local prejudices in favor of oil, and especially of bear's oil, for domestic animals, when attacked. The same practice has been tried on the human subject, and some writers declare that the success of such management is remarkable. The constipation is singularly obstinate, and purgatives are with difficulty retained on the stomach. One physician states that, in a case which had resisted all his other remedies, he had used quicksilver with success. Calomel forms the chief dependence of the majority of practitioners, some of whom give it in very large doses and alone, while others combine it with opium and employ smaller quantities. It is said to be very difficult to obtain the excitement of ptyalism. In one district it is treated by stimulants almost exclusively, peach brandy being greatly preferred.

If a case of this nature were to occur under my care, I would prefer to treat it as the effect of an acrid poison, and one for which no antidote was known. If the stomach were not emptied by spontaneous vomiting of the deleterious food taken, I would wash it out with draughts of warm water or ipecacuanha. I would apply leeches or cups to the epigastrium or abdomen, and give the patient ice and cold fluids. The first stage being past, and excitement continuing and becoming more general, I would resort to venesection, and administer such purgatives as could be best borne, perhaps preferring castor oil, aiding them by proper enemata. When the bowels had been rendered soluble, I would depend for farther advantage upon the mercurials, combining them with moderate doses of opium, and persisting until the gums should become spongy, and the salivary glands be urged to increased secretion. Many physicians place their peculiar dependence, we are told, upon the persevering employment of active purgatives, which they continue to exhibit for several days in succession. I confess, however, I cannot understand the adaptation of the drastics, as gamboge, aloes, etc., to the removal of such symptoms as they describe.

Great care should be taken to guard the patient from improper food when convalescent, and to protect him from the effect of sudden alternations of weather by warm woollen clothing.

CONSTIPATION—*Costiveness.*—The function of defecation regularly performed, is necessary to health and comfort. The frequency of the act is originally different in different persons, but is often doubtless determined by habit and convenience. With most, an alvine movement takes place daily; in some, it may be twice as often; and in others, every second or third day only, without any suffering. Costiveness, then, is a relative term, well understood.

After a certain interval elapsing without the bowels being emptied, there ensues a sense of fulness and weight in the belly, with flying pains, anorexia, and slight nausea; the tongue is furred, the breath fetid, the complexion muddy and sallow, the eyes yellowish and injected; emaciation takes place, and a disagreeable odor exhales from the body. The period being further protracted, say from seven to fourteen days, the symptoms become more urgent; the belly is tense, and will bear no movement nor pressure; there is meteorism, with hiccup, vomiting more and more violent, until it becomes stercoraceous; in some cases sudden pain betokens rupture of the intestinal tube at some point, and the patient sinks rapidly.

The *causes* of constipation are numerous, but they may be comprised under a few general heads: 1. Defect of sensorial energy: 2. Impairment of local innervation; 3. Mechanical obstruction. The first set of instances we meet with among those who live sedentary, indolent, or studious lives, or who suffer from maladies which detract notably from the tone of the system. The second is often the result of a monotonous or insufficient diet, which fails to stimulate the digestive organs—as in dyspeptics; and also of a habitual use of cathartics, by which the sensibility of the tube is exhausted, or its contractility fatigued. This condition is brought on too by great mental preoccupation, extreme hurry of business, or any other contingency which shall lead to forgetfulness or obstinate postponement of this important function. 3. Mechanical obstructions are formed by impacted ingesta, husks, and seeds of fruits, cherry-stones, bones swallowed; absorbents taken, chalk, clay, magnesia; by inflammatory constriction and adhesions, intussusception, hernial involvement, convolution, or twisting together of the bowels.

Autopsy exhibits in different cases the effects of the conditions above stated, inflammation, ulceration, immense distension, perforation, laceration, sphacelus.

The *treatment* should be relevant to the cause, which must be removed if possible; the diet should be changed, and made various with fresh meats, vegetables, and ripe fruits in season; resinous and drastic purgatives should be denounced, and a preference given to the milder articles. "Belladonna," says Trousseau, "is the remedy par excellence for constipation. It does not purge, it only facilitates alvine evacuation. It is difficult to say to what it owes this property; what is certain is, that the fifth of a grain of belladonna almost always procures several movements; the dose may be increased to one grain, but as soon as the habit of defecation is restored, the dose must be diminished and gradually abandoned." (*Gaz. des Hôpitaux.*) I have not succeeded with the small quantity mentioned; but I find belladonna a very good addition to small doses of rhubarb or aloes as a laxative. Each one has his favorite pill or bolus, but great reserve should obtain in thus artificially soliciting the peristaltic movements. The natural cathartic waters, such as the fountains of Saratoga, provide us the safest means that I know of. Rhubarb, charcoal, mustard seed, and oxgall, may be tried; and a habit of regular periodical attention to this great necessity instituted and kept religiously unbroken.

Kneading the abdomen (Halsted's method) has been found useful, when there is mere torpor; it arouses expectation too. Electro-magnetism and galvanic excitants are extolled. Examine carefully to detect hernia, if it exists.

If the obstruction is obstinate (mechanical), throw enemata high up with O'Beirne's flexible tube; if from hardened feces, break them down with a wooden scoop. Persevere with mild, oily, or saline purgatives. Pills of gold or silver have been eulogized, and fluid mercury taken in draughts of from six ounces to a pound; it is affirmed with good effect.

I know no reason why, when all reasonable efforts fail in obstinate constipation, we do not oftener resort to enterotomy. The establishment of an artificial anus as in some hernias, would prolong the patient's life, and give him a chance of ultimate recovery. Cases have now accumulated to a large number in which this operation has been performed for the relief of intestinal obstruction. An analysis has been made by Mr. Cesar Hawkins of forty-four cases thus treated. "Of these, twenty-two recovered from the operation; ten died within forty-eight hours, nine survived beyond a year. In only one had natural feces passed chiefly by the anus afterwards; in one surviving three years, not even flatus passed; in one surviving seventeen years, none passed naturally after the first two years. Yet in all who survived the operation, life was prolonged, more or less."

The modes of obstruction discovered are extremely various. In Mr. Hugh Legare's case, described by Dr. Bigelow, the bowel was twisted upon itself irretrievably. Internal hernia occurs oftener than was suspected; tumors exist; bands; malignant and fungous growths, and thickening of the coats of the bowel, in one instance so great, that not even a bristle could pass. Now in all such examples it is evident that enterotomy gives the only chance for life.

It seems worthy of note that in several recorded cases, diarrhœa preceded the obstruction, even when mechanically caused. We infer that it is in the small intestines if vomiting supervenes early; if late, it is probably in the colon or rectum.

The caput coli is often chosen as the seat of incision. Hodgson thinks, however, that "when practicable, the opening should be made in the left rather than in the right colon, as more nutrition may be accomplished." (*Lancet*, March, 1852.)

I insert the record of two American operations successfully made.

One was by Dr. Wilson, of Tennessee; "the subject was a negro man, æt. 20 years, laboring under bilious colic, with obstinate constipation and stercoraceous vomiting of seventeen days' duration. The incision was made in the linea alba, stricture and intussusception found in the ileum; the part included was dark, and the adhesions strong. Recovery here was rapid and perfect." (*Trans. Journal*, vol. 8.)

Dr. Kyle, of Ohio, performed enterotomy on a child aged two years, at a spot on the right side, where local inflammation and pointing occurred; a brown corn straw was extracted, of forked shape, thirty-three lines long, swallowed fifteen days previous. This boy also recovered. (*Phil. Med. Exam.*)

An extraordinary case is related in the *Gazette des Hôpitaux*, in which the obstruction was of eighty-two days' standing. There was vomiting for the first forty days; then an interval, in which the patient took food. On the fiftieth day the vomiting returned, after which she was nourished by enemata. There were tension and agony, sometimes relieved by copious eructation. M. Joel opened the small intestine, according to Maisonneuve's plan, and the patient regained health, with an artificial anus. It is observed, in this case, that the digestion of animal matters, and of bread and milk, seems complete. Vegetables are incompletely assimilated, and more or less recognizable.

COLIC.—This distressing affection, in its various forms, is among the most frequent which demand the attention of the practitioner, and is, fortunately, one of the number of those over which we may exert the readiest control.

Colic is subdivided by writers into a great number of species. Cullen makes seven; Good, six. Many more might easily be added. We have colic arising from many purgatives, from many poisons of specific character, from mechanical obstruction in hernia, external or internal, from hemorrhoidal tumors, scirrhus of the rectum, from enemata, whether of irritating quality or large quantity. I have known it produced in great intensity from an enema of tepid water. It arises from crude ingesta; occurs in the course of the exanthemata, and in many fevers. It may or may not be attended by stercoraceous vomiting, or intussusception; but all these modifications, the enumeration of which seems merely an announcement of the causes, remote or exciting, which may give rise to it, have been treated of as separate species of a particular genus. I yield so far to the common custom of American authors as to admit and treat of three varieties of colic, viz; 1. Simple colic, otherwise ileus, or wind colic, or flatulent colic; 2. Colica biliosa, and 3. Colica pictonum, premising that while I follow this arrangement for the sake of convenience, I by no means acknowledge any specific difference to exist in the nature of the proximate and essential cause which I hold to be identical and the same in each of these, and all other varieties of colic.

1. *Simple colic* may be briefly described as presenting the following symptoms: Pain in the bowels with a sense of twisting and griping, chiefly about the navel, with nausea for the most part, and costiveness. The pain is accompanied usually with a sense of distension of the

abdomen, and general uneasiness. At first there is no tenderness upon handling, but often a degree of relief is given by pressure, which is therefore applied forcibly to some particular part of the belly, frequently about the caput coli. There are violent attacks of tormina, occurring at intervals, like the strong impulse downward from the action of a drastic purgative, the propulsive action proceeding to a certain point and there stopping. The distension, from being a mere sensation of the patient, becomes very obvious, and a tympanitic inflation of the abdomen ensues, with great distress in breathing from the upward protrusion, no doubt, of the diaphragm into the thoracic cavity. The nausea and vomiting are more and more frequent, following the paroxysms of tormina above described. The contents of the stomach having been emptied, an inversion of the peristaltic movement of the intestines is at last brought on, and stercoraceous matters are thrown out of the mouth, which symptom has given name to an often recognized variety of colic, known as the "iliac passion."

At first the pulse is unaffected, but after a time increases in frequency, losing force and volume as the case progresses; cold sweats break out on the face and become general, and the patient, if unrelieved, may sink at once, exhausted by the mere intensity of his sufferings. More commonly, however, an inflammatory stage will supervene, and enteritis of exquisite character be developed, with ulceration or even gangrene of large portions of the intestines. Post-mortem examinations not unfrequently exhibit intussusception of a portion of the tube in another portion, the inner being strangulated by pressure, and running rapidly into mortification. The occurrence of this terrible accident has been discovered in some cases even before death, by the protrusion of the lower part of the strangulated bowel at the anus, as affirmed by Abercrombie.

Many of the *causes* of colic have been already alluded to. It arises, perhaps most commonly, from the presence and irritation of crude and indigestible articles of food. It may be brought on by fasting for a long or unaccustomed period, and by exposure to cold or wet, especially when applied to the feet. It may be occasioned, indirectly, by any of the passions of the mind, and in general by the influence of all such circumstances, formerly enumerated, as interfere with the due performance of the digestive function. An extrication of air or gas, which distends the abdomen to an enormous extent in certain cases, has been mentioned as among the ordinary symptoms of the disease, and every one who has been the subject of colic is aware of the great and immediate relief which attends its escape, whether upwards or downwards. Such gases may in part be the product of the chemical decomposition of crude and undigested vegetable aliment. Dr. Hales tells us that an apple, during this process, will give up above six hundred times its bulk of air, and there are several vegetables habitually employed as food, which are said to evolve even more air than the apple. But we cannot thus account for the tympanitic distension in all cases. To the number of instances recorded by authors, in which the obvious evolution of gas was beyond all explanation by any reference to any supposable state of the ingesta or their quantity, I will add a very remarkable case from my own practice. A patient laboring under scarlatina, in October, 1831, was affected with a very irritable state of the stomach and bowels, that admitted neither of the administration of food nor medicine. Tranquillity and costiveness followed this expectant treatment, and after a very quiet day it was thought advisable, in the evening, to empty the lower bowels by an enema prepared in the usual way. This produced a severe paroxysm of colic, with great discharge of air, both upwards and downwards, though no token of the presence of any had previously been observed. Twenty-four hours after, the enema was repeated, a mere mucilaginous solution (strained gruel) being employed. This was followed by the same consequences. The experiment was tried a third time, with simple tepid water, at the same interval, with the same result, so highly aggravated, that the sufferings of the patient were intolerable, and required to be allayed by free doses of opium.

I have no doubt, therefore, that in such and similar cases, the exhalant vessels opening upon the mucous surface of the stomach and intestines, may throw out, instead of their normal and habitual secretions, either gases of various kinds, or a fluid whose affinity for caloric is such that it assumes, as soon as evolved, the gaseous form. But this subject deserves a special consideration, which will detain us for a moment.

Pneumatosis—a word first employed, I think, by Vogel, properly means the morbid generation of air or gaseous fluid. Air is contained normally in several of the cavities of the body, as the trachea, bronchi, and air cells. It exits, also, in the stomach and bowels. Abercrombie says they are collapsed in the natural state; but auscultation and percussion prove the contrary, and the escape of air upwards and downwards is consistent with the best health.

Air in morbid localities is variously denoted. It is Emphysema in the cellular tissue of organs and under the skin; we have Pneumothorax from an opening between the lung and pleural sac, and tympanites of the peritoneum from a perforating ulcer in the intestine. Vogel enumerates here "pneumatosis of the pericardium, and the membranes and ventricles of the brain."

In the digestive tube, the presence of air in a certain amount is normal. Prof. Hooker tells us "that in the healthy subject there is an almost constant succession of sounds produced by the motion of the contents of the intestinal canal." Percussion shows, too, resonance over the abdomen, except upon the spleen and liver. An undue amount of air within this cavity constitutes often, however, a prominent symptom of disease. It is sometimes, I think, a *primary affection*, not unfrequently of immense annoyance and unconquerable tenacity. Its presence is ascribed to the decomposition of the ingesta, and many articles, as I have said, evolve large quantities of it. But besides this, it must, I am satisfied, be either directly or indirectly exhaled or secreted from various surfaces. This source, denied by most, is admitted by Williams and Vogel. It is proved by a large mass of facts. Flatulence comes on often after fasting. I have mentioned an instance.

Dyspeptics are often attacked in this way, and some, indeed, eat to prevent a fit of colic. It is often connected with neuropathic disorders; hysteric colic, and the globus hystericus are familiar. It often attends on paroxysms of nephralgia, and is known as nephritic colic. It comes on occasionally in a regularly periodical form. I have twice seen the stomach suddenly distended with air to such a degree as to press up the diaphragm, and displace the heart, and oppress the breathing, by compressing the lungs.

The air formed in the digestive tube varies, consisting of carbonic acid; (Williams says) oxygen and azote, and sulphuretted hydrogen; (Vogel adds,) phosphoretted hydrogen and hydrosulphate of ammonia.

Tympanites is usually considered as merely intestinal distension. I have maintained that, besides this, there is a true peritoneal meteorism. Bartlett himself says of the tympanites of typhoid fever, that "the flatus rarely passes off per anum, and seems to be but little disturbed by the peristaltic motion of the intestine." No reason can be shown why air should not be thrown out into this sac. A sudden gaseous distension of the abdomen subsiding into dropsy, occurred to Prof. Chapman; another is reported by Darwall, and one by myself.

Meteorism is not confined to typhoid fevers, but occurs in many others. In the quotidian intermittents of Fernando Po, described by Bryson, "the cold stage was slight and short; swelling at the præcordia from flatulence, with an uneasy sensation in both hypochondria generally accompanied it."

Parr long ago recognized the existence of a "tympanites abdominalis" as distinct from the intestinal form. He considers it as generally arising "from the evolution of air in consequence of putrefaction. Authors," he says, "have spoken of the secretion of air, which we do not deny, since it apparently takes place in the air-bladders of fish." He afterwards refers to a case of abdominal tympanites "relieved by an abscess of the umbilicus." There are, indeed, numerous examples in the books of the evolution of air on surfaces, and in cavities and tissues. Sir H. Smith gives one of a gentleman, subject to enormous inflation and eructation, who also threw out, while in the bath, air bubbles from his skin and from his bladder. Piorry reports a case in which the liver contained air. "On cutting into it, it was found to have lost its granular appearance. On pressure, it crepitated like lung, and swam in water; if squeezed, bubbles escaped from it, and it then sank. In other respects it seemed healthy; neither it nor any part of the body had undergone putrefaction. Had the organ been percussed during life, it must have been mistaken for lung; and when cut into after death, a superficial examination might easily have led to the same error."

Among tumors, Paget describes "the gaseous;" but one example of which he is acquainted with. This Hunter received from Jenner for his museum, and had the air it contained examined by Cavendish. We cannot wonder at Paget's enthusiasm about "the convergence of intellectual light on this mean object; and the combined perfection of the elements of an inductive process"—with "Jenner to observe, Cavendish to analyze, and John Hunter to compare and reflect." Durand Fardel reports a case of "spontaneous development of gas in the blood," which he regards as causing sudden death. Ollivier, of Angers, gives us another similar. Cless (of Stuttgard) has collected thirteen instances of this "pneumathœmia," as he calls it; in two, of which we have the details, he found air in the right auricle and ventricle; and in one in the blood of the right side of the heart and of the liver. There were no marks of decomposition in either.

We may consider pneumatosis, then, as a recognized morbid condition like typhosis and tuberculosis. I do not hesitate to regard it as an essential element in the pathology of colic.

Autopsy.—"The most uniform morbid appearance in fatal cases of colic, is a greater or less extent of the intestinal canal in a state of great and uniform distension." This distended portion may not be at all altered in structure. It may be found in various stages of inflammation, from a recent tinge of redness to extensive gangrene. Other portions have been found contracted and agglutinated. I have already mentioned the frequency of intussusception. Organic disease of great diversity may constitute a part of the description of the fatal cases of ileus; but these, which have been already alluded to, and some of them enumerated, seem to me entirely incidental and unessential; a long list of them is to be found in Good, Cullen, and Abercrombie.

The *pathology* of colic seems to me to be sufficiently intelligible. It consists of two elements equally essential, which must concur: 1. A morbid secretion or exhalation which distends painfully, and which is denied escape: and 2. An intestinal spasm of some portion or portions of the tube forming a stricture, and interrupting the normal peristaltic action. Both these are proved, I think, by the phenomena which present themselves during life, and by the post-mortem appearances.

Abercrombie, however, always to be referred to with respect, contends that, in colic, the distended part of the intestine is the true and exclusive seat of the disease, which consists, pathologically, in a muscular paralysis of a portion of the internal muscular coat of the intestine. He denies that the contraction (so called) of the contracted portion of the intestine, is effected by spasm; but, supposes it to be "merely collapsed because it is empty, its muscular action being unimpaired." He endeavors to explain the familiar phenomena of colic, by the supposition that the passage of the alimentary ingesta or flatus ceases at the point where the muscular impairment of the capacity for contraction exists, and that distension must begin there. To this distension, progressively increasing, he refers the subsequent symptoms. Thus he entirely ignores the existence of the pneumatosis, so uniformly present; the familiar and essential cause of the forcible and painful distension, which he looks on as perfectly passive and consecutive. Now, it is easy to explain why the evidences of disease should be more remarkably exhibited in the distended part after death. If death has occurred early, the spasm or constriction may have entirely disappeared; muscular contraction, whether natural or morbid, must cease when life is over. Nay, such spasm may have relaxed occasionally during the continuance of the disease, and returned again. The changes occurring as the result of this spasm are twofold, being both local and general. The circulation is stopped in the mucous tissue of the intestine above, and congestion, inflammation, and gangrene thus brought on. The general system is thus affected, first, by the impediment offered to the performance of the digestive function; and, secondly, after a little while by the inflammation of part of the digestive tube. This inflammation is rapidly increased, if the stricture be close and obstinate, by the internal pressure of the accumulated secretions, which may even rupture the tube unless carried upward by an antiperistaltic movement and vomiting.

But, on the other hand, if the case is sufficiently protracted to allow of the occurrence and extension of inflammation which shall agglutinate the contracted fibres, permanent and undilatable stricture is detected.

How shall we account for intussusception on Abercrombie's view? It is difficult to conceive how a distended portion of intestine should enter into the collapsed tube below it, whose "tonic contraction" is not overcome by the regular propulsion of the feces and flatus. And if the smaller portion above, which is in a natural state, does descend into the enlarged portion of the tube, this latter cannot contract upon it to form stricture. Now, it is plain that a strictured part of the tube will be smaller than the part below it, which is collapsed or in a natural state of tonic contraction. The strictured point, then, in relation to the necessarily distended portion above it, will represent the apex of a cone, which, being pressed downwards by the violent, voluntary, and involuntary efforts of the patient, will readily enter and pass along the tube below, even to the anus, as in one of Abercrombie's own cases.

The analogy to hernia, too, may be allowed some weight in this matter. All the phenomena of ileus attend upon strangulation of a "rupture."

Distensibility is the natural condition of the intestine, and to be distended its passive function. The sudden production then of colic, in instances where the distension cannot be large or inordinate, is not to be accounted for otherwise than by the supposition of irritation and spasm. And how, but by the occurrence of spasm, can we explain the sudden stoppage of a fluid or semi-fluid substance along the tube, urged too by a *vis a tergo;* for the distended portion may not be long, and the bowels are acting above it.

I would press the argument *a posteriori*, which, indeed, has been used by our antagonists themselves, in their reference to galvanism as a valuable remedy in colic. If colic be not owing to spasm, but to muscular paralysis and distension, whence the utility of venesection, the warm bath, opium, tobacco, remedies which I have chosen to mention as they are selected and eulogized by Abercrombie? "There are cases," he says, "which yield to a full dose of opium," a fact, he tells us, familiar to every practical man. It is no wonder that he should allude to it as illustrative of "the peculiar and intricate character of the disease." "The warm bath," he says, "is often beneficial;" is it by relieving distension? "The relief," he says, "from venesection is often so complete and immediate, that there is no time to raise the patient out of bed, before complete evacuation takes place." Finally, "the tobacco injection," he tells us, "is, as far as my observation extends, the remedy of most general utility in all forms and stages of ileus." This is conclusive, for tobacco is our most efficient relaxant, and exhibits here most remarkably its valuable power of overcoming spasm.

The *treatment* of simple colic is not usually a matter of much doubt or difficulty. In an infinite majority of cases, the domestic management is promptly successful. This consists in the administration of aromatics, of which the chief are alcohol, ether, mint, camphor, ginger, etc. It is, I suppose, by their anti-spasmodic influence, that these are useful, for they possess no other power in common. Perhaps they may, as stimulating the stomach, exert in a certain degree a revulsive influence.

Colic which follows a full meal, or is occasioned by the taking of indigestible or deleterious articles, must be treated by the quick exhibition of an emetic, which will very often give entire relief. If from exposure to cold or moisture, we must place our patient in the warm bath, and afterwards cover him up warmly in bed, applying large poultices or other fomentations to his abdomen, and sinapisms to his feet. Opium is here especially serviceable. Indeed, I resort to it, without delay, in a very large majority of the cases which fall under my care, and have rarely any occasion to omit it. The purgative practice, as initiatory or resorted to in the first instance, I condemn most unequivocally; believing it to be more likely to aggravate than diminish the sufferings of the sick man, if depended on previously to the relaxation of the stricture of the bowel by the proper means. A mild cathartic is a secondary measure of great importance and utility, and should not often be neglected. To prepare the way for the free evacuation of the canal, calomel may be at once added to the opium prescribed, and this will of itself frequently suffice. If it should not, the gentlest means that will effect our purpose are next to be tried. When the stomach will bear it, castor oil is the best of these, and is almost always preferable for children. Some adults will not take it who will be pleasantly acted upon by rhubarb, and although I do not in general advise saline purgatives under these circumstances, yet there are not a few, who consider the Epsom salt entirely unobjectionable in its manner of operation. We will sometimes find a return of the disease follow the unsuccessful exhibition of a purgative. It is not wise, in this case, to press the cathartic nor to attempt to move the bowels by increased doses. It is best to return to the relaxants. If there be a sound constitution, we may use the lancet freely. It must never be neglected if the pulse rise in force and frequency, or the belly becomes tender on pressure, or the skin is hot and the tongue dry. The warm bath and fomentations should be repeated. Large poultices with mustard are the best of this class of applications, and should be laid upon the abdomen, and to the lower extremities. If nausea prevail to any extent, we must abandon the exhibition of medicines by the mouth, with the exception of calomel and opium, which should be freely prescribed, in doses proportioned to the urgency of the symptoms.

In the meanwhile enemata should be given. The ordinary mixtures should first be resorted to, and will generally be found sufficient for our purposes. The introduction of a flexible tube far up into the intestine, as advised by O'Beirne, may be cautiously attempted, and will sometimes give vent to a large quantity of air, to the great relief of the patient; or it may be employed to convey the enemata so high as to stimulate the bowels to an increased energy of peristaltic action, which may overcome the obstacle to a thorough evacuation. If they fail, we may try the more energetic formulæ, those, for example, which contain turpentine, tartarized antimony and tobacco.

I am not fond of using any of these, and have seen little of their effects, but they are highly recommended by writers on the disease, and may therefore be numbered among our ultimate resources. When there is apparent torpor without inflammatory symptoms, or obvious febrile action, the turpentine injection is to be preferred. Turpentine is highly stimulating and irritating, and ought not to be employed when there is any reason to suspect an inflammation of the mucous surface, especially of the lower intestines. It is usually given rubbed into an emulsion, with mucilage, or the yelk of an egg. When judiciously prescribed, we will have occasion to be pleased with its powerful cathartic action.

The tartar emetic administered in this way, is a most impressive relaxant. I have made use of it in a very few extremely difficult cases, to obviate obstinate constipation; but it is not unattended with danger to the patient, as it depresses his already enfeebled functions, and produces the most distressing sickness. Great caution should therefore be observed in its exhibition. I dissolve ant. tart. ℈i, in a pint of water, throwing up into the rectum one-half; if no evident effect be produced after twenty or thirty minutes, the remainder may be given. The consequent relaxation of every muscular fibre in the body, rarely fails to be followed by an alvine evacuation, which is copious and offensive, in a degree proportioned to the previous circumstances of the case.

The tobacco injection is attended with very similar dangers and benefits, as the solution of tartar emetic. It is, however, more generally resorted to, and is recommended by many writers of very high authority, among whom Abercrombie does not hesitate to describe it as "the remedy of most general utility, in all forms and stages of ileus." All agree, however, that it is to be handled with great caution. Not more than fifteen grains, infused for ten minutes in six ounces of boiling water, should be given at first, to be repeated in increased quantity, after waiting from half an hour to an hour, until its peculiar effects are exhibited in vertigo and profound general relaxation. Thus managed, it may be considered as tolerably safe; but Earle proposes, as a method of still greater security, the introduction of a half-chewed quid into the anus, to be withdrawn, as the ordinary symptoms of prostration come on. A moistened cigar may be used in the same manner, as a suppository, and for the same purpose. The internal use of tobacco smoke, both by the mouth and rectum, is very common among old women and nurses, who relieve the colics of infants very frequently, by giving them water to drink, into which the smoke from a pipe has been blown for several minutes, and using the same as an injection.

I must not omit to mention a mechanical mode of overcoming the obstinate obstruction of the bowels, forming so principal a feature of colic, which was originally proposed by De Haen, and has received warm commendation from Cullen and others. It consists of the gradual and progressive distension of the lower portion of the intestines, by pumping in large quantities of simple water. It is said that two gallons have been thus thrown up successfully. I cannot but regard this as a useful addition to our remedies. In one of my most unfavorable cases, it was attended with a happy effect, after the failure of all other means of cure assiduously employed.

With a view, I suppose, to a similar mechanical removal of obstruction, but from above, large quantities of crude quicksilver have been frequently employed, especially by British practitioners. Abercrombie tells us, that he has repeatedly tried it "in doses of one or two pounds." He says, however, that he has seen no other effect from it than that "it certainly appeared to allay the vomiting." Pills of solid gold or silver have also been administered, I presume, with the same mechanical purpose; for I can imagine no other mode in which they can be expected to fulfil any valuable indication. But this view is no less unreasonable than gross. It is surely overlooked, in this coarse speculation, that their weight, if it is by this quality they are to prove efficacious, will be as much opposed to their passage in some of the turns of the intestines, as favorable to it in others, so as in this way fairly to neutralize their effect.

2. BILIOUS COLIC, a form of ileus recognized in a great number of American essays, is a modification of the disease which owes its characteristic qualities to the cause immediately instrumental in its production, to the constitutional temperament in which it exhibits itself, and to the season of the year in which it is most apt to be met with.

It occurs during the summer and autumnal months, affects persons of bilious habit of body, and such as are liable to hepatic disorder, and is attributed to the influence of malaria. The immediate intestinal excitement may be, not unreasonably, conjectured to arise from a morbid secretion from the liver, of an acrid and irritating fluid. Many writers have traced its close analogy with our *autumnal remittent.* It arises under the same circumstances, follows similar exposure, is sometimes (Rush incorrectly says always) ushered in with a febrile chill, and is frequently attended, throughout, with the familiar symptoms of this type of fever, a full and frequent pulse, great thirst, the tongue being thickly furred, and of a brownish yellow hue; there is incessant nausea, with frequent vomiting, often of bilious matter; pain and heat are felt at the pit of the stomach, with great distress and oppression of the præcordia; there is frequently recurring disposition to go to stool, with intolerable griping in the belly, chiefly about the navel, but the constipation is obstinate and difficult to overcome. The patient rolls and tosses himself in every direction, crying out for relief from sufferings which he is not able to describe or sustain.

Treatment.—The picture which I have drawn will give, I fear, but an inadequate idea of the violence of the attack of this formidable malady, or of the urgency with which the case demands prompt and judicious management. Venesection is the first remedy. In no other instance can there be a more evident call for the use of the lancet than in this; and there is none in which its bold and ready employment is attended with more satisfactory results. After opening the vein, let the blood flow freely from a large orifice, without regard to the quantity, until some sensible effect is produced; the patient declaring himself completely relieved, or falling into syncope. Should the pain return, and the pulse rise again, we must repeat the bleeding without hesitation; it may be necessary to do this twice or thrice. Persons liable to be affected by this form of colic are almost always robust and plethoric, and bear venesection well.

The next object is the free and perfect evacuation of the bowels—of difficult attainment, because of the spasmodic obstruction which prevails, and also because the stomach becomes, from the commencement of the attack, so irritable as scarcely to retain anything swallowed. To meet the complicated indications arising from this state of things, it is my custom to prescribe calomel and opium, in as large doses as can be borne. The former is our best cathartic, under the circumstances; and the latter, so far from delaying its operation, as has been objected, rather promotes it, by relaxing spasmodic constriction and diminishing the hyper-sensitiveness of the stomach and bowels. It is, indeed, necessary to relieve, with as little delay as possible, the extreme anguish of the patient. Nothing is better adapted to do this than opium. A dose of from three to five grains may be administered at once, with ten grains to ℈i of calomel, to be repeated in an hour or two, if required. In the meanwhile, place the patient in a warm bath, and when he is taken out of it, cover the abdomen with warm poultices, containing a small proportion of mustard.

Enemata should also be promptly used. The ordinary forms may be at first tried. If these fail, resort may be had to turpentine, tobacco, or tartar emetic, or distension by large quantities of water. The cold bath generally, the shower bath, the dashing of cold water on the abdomen, feet, and legs; the placing cloths, moistened with ice-water, or lumps of ice upon the belly, have been recommended; and there are authentic testimonials to the success of these impressive means. The internal use of ice and cold fluids I believe to be not only pleasant and palliative of suffering, but directly remedial. I have always allowed them in the treatment of febrile diseases, and have never, so far as I recollect, had occasion to regret the indulgence.

To assist or continue the cathartic effect of the combination above advised, other purgatives may be substituted when the stomach is calm enough to bear them. Of these, the least irritating in general deserve the preference; castor oil will answer the purpose well in most cases. In some, the Epsom salt is unobjectionable. I employ the latter very frequently in mixture with rhubarb and some aromatic. A loose state of the bowels must be kept up for some days, the patient generally requiring to be treated very nearly as if he were ill of bilious remittent fever.

The same observation will apply to the state of convalescence—recollecting that peculiar caution is to be observed in the management of the diet of the patient, which, for a long time, must be very plain and abstemious.

3. Colica Pictonum; *Colic of Poitou, of Devonshire; Painters' Colic.*—This form of disease has received these various denominations from the localities in which it has been most frequently met with, and the trade or occupation which renders men most liable to its attack. It has been pretty clearly proved, I think, to be in all cases attributable to the poisonous influence of lead and its salts. These agents are used for so many different purposes in the arts, and even, I might almost say, in domestic economy, that any one may readily become subject, unawares, to its deleterious impression. Thus, in Devonshire and Poitou, above referred to, it has been long and much employed, to diminish the acidity of the weak wines and ciders, for which they were noted. Much of the ardent spirits (gin especially) and malt liquor, used by the lower classes in our own country, are more or less strongly impregnated with it, either by direct admixture, or by being passed through tubes or pipes constructed of it, at least in part.

House-painters, glaziers, plumbers, and printers, are likely to be seized by this species of colic. It has been known to affect those who sleep in newly painted houses; nay, what is most of all strange and unaccountable, it is alleged to have been produced and kept up by the effluvia thrown off from the clothes of those who make much use of it in their daily occupations, as plumbers and painters.

It is remarked to be of very common occurrence among animals in the neighborhood of smelting houses, and I have known it fatal to dogs, &c., belonging to painters, from their drinking out of the vessels in which the brushes were occasionally kept in water.

Much discussion has taken place, and is, indeed, still going on, as to the injurious influence of water conveyed in lead tubes, and thus impregnated with this poison. Upon careful perusal of the numerous documents accumulated on this subject, I am led to the conclusion that, although there has been some exaggeration of the actual evil, yet that there is really good foundation for the fears entertained, and that all water which has passed through leaden pipes, and still more that which has been allowed to remain in tanks lined with that metal, is dangerous and should not be used either for drinking or cookery. Soda water is also, at times, hurtful, for similar reasons, and tin pipes should be everywhere substituted.

Colica pictonum commences with a dull pain at or near the pit of the stomach, extending downwards to the navel, where it fixes and increases to extreme severity. The abdominal muscles become sore to the touch, and are drawn backwards to the spine with much pain in the loins and back, whence the name *rachialgia.* A bluish line is seen along the gums; the tongue is furred and sodden; there is obstinate constipation, with occasional but ineffectual desire to evacuate the bowels. There is often, but not invariably, nausea and vomiting, and a green porraceous bile is thrown up with mucus. The pulse is small and not particularly tense, but rather quick and frequent. Dimness of sight, double vision, and even total blindness have been known to occur in the progress of the case. The patient becomes feeble and much emaciated, pale and anemious, or sallow and livid, and prefers a bent posture, leaning forward on his knees. Hiccup is troublesome in the last stage, and deglutition becomes difficult and painful.

The *diagnosis* is not always easy, unless we are assisted by the history of the case, and known exposure to its causes. The retraction of the muscles of the abdomen, and the blue line along the gums, caused by a deposit of sulphuret of lead formed by the combination of the "tartar of the teeth, or of the sulphocyanic acid in the saliva with the lead-poison in the blood," are considered characteristic.

The *prognosis* of colica pictonum is generally favorable. Few die of it under proper treatment. Indeed, it is apt enough to subside slowly of itself, if the patient be protected from the repeated action of its specific cause.

The duration of the disease is various, extending from days to weeks. Under favorable circumstances it may yield readily and terminate at once in perfect recovery; but it is apt to recur, and still more apt to leave behind it a train of obstinate and troublesome attendants. Among these, epilepsy is not uncommonly met with; but the most frequent perhaps, is a remarkable paralysis of the upper extremities, sometimes affecting but one, sometimes both hands. In this local palsy the joint at the wrist becomes loose and flaccid, and there arises a tumor on the back of the hand, with wasting of the muscles of the forearm and arm.

Autopsy presents nothing satisfactory or uniform. The bowels are generally pale; sometimes with appearance of inflammation, but rarely; the intestines are contracted in some places, in others irregularly distended. Lead is found in the blood, the liver, and in the brain, it is said, when analyzed.

The *treatment* of colica pictonum was formerly a matter of warm discussion among physicians, but at the present day there exists but little difference of opinion as to the indications of cure.

Opium is by almost all regarded as a principal remedy, and is employed largely and freely. Its efficacy is by no means limited to its immediate relief of pain, in which it excels; but by the relaxation of spasm and the subdual of irritation, it paves the way for the successful exhibition of cathartics, which, indeed, operate most gently and perfectly when given in combination with it. Pemberton highly eulogizes a formula containing castor oil with tinct. opii, and some aromatic; while others substitute Epsom salts as a preferable purgative. Either of them will answer our purpose generally.

Irritability of stomach presents, in some instances, a very great difficulty in the management of the case, the nausea and vomiting being so readily excited that nothing is retained for a moment. Here we must administer the opiate in an enema, or by persevering friction, as recommended by Ward, who speaks very highly of its application to the surface. We may introduce it into warm poultices, which should be laid upon the abdomen, while sinapisms are applied to the extremities. If the pulse be tense and chorded, or the strength of the patient admit, the lancet will be found useful, though we cannot, generally, bleed largely or frequently, the subject of colica pictonum. In the more severe attacks, the preferable cathartic will be calomel, which will remain on the stomach more readily than any other, and which it will be often proper to continue in smaller doses until ptyalism is produced. Combined with opium, it forms one of our most certain and useful resources in the most obstinate cases, and will often effect a cure without any further prescription. The hydriodate of potass is alleged by some to exert a specific influence in procuring the elimination of the poison. Its use must, for this object, be persisted in for some time.

The sulphate of alumina, common alum, is affirmed to exert a most favorable influence in these circumstances. The high names of Grashuys, Richter, and Percival unite in its praise. It is given in a dose of from six to fifteen grains every three or four or five hours. Brachet prescribes from 1½ to 2 drachms, in a ptisan, to be taken daily, adding to this amount 40 or 50 drops of laudanum. If the bowels are confined, a mild aperient every third day. More than one hundred and fifty patients have been thus treated with complete success; "cito, tuto, ac jucunde."

Nutmeg, also, has been recommended as possessing no little efficacy here. Ergot has been very highly lauded, as exerting some obscure efficacy in colica pictonum. I have no experience with it.

Sulphuric acid in dilute mixture, sweetened and drank as lemonade, is urged by some as a specific antidote, and has been extensively employed as a prophylactic. It is supposed to combine with the poisonous carbonate of lead, and form an insoluble and, therefore, harmless sulphate. Mialhe denies this chemical effect, and condemns its use. His objections, however, seem to me merely theoretical, and of no weight when opposed to facts.

During convalescence from colica pictonum, great caution is necessary in the diet allowed to the patient, which should be light, nourishing and rather laxative. Flannel should be worn next the skin generally, and a flannel roller round the trunk of the body, and the feet carefully kept warm and dry. A return to former occupations, if they necessarily expose him to the influence of lead, should be avoided.

We are much embarrassed in the treatment of the paralysis of the arms and hands, so frequently met with as a consequence of this disease. I have been accustomed to resort to the use of the combination of opium and calomel, in small doses, while I kept the hand and arm constantly supported by the carved splint recommended by Pemberton. It is a remark of De Haen, which I believe to be true, and which will encourage the use of opium, "that paralysis succeeds less frequently when the cure is effected by this remedy than any other." The gentle catharsis that will be kept up under the plan advised, will be found useful; and a slight ptyalism, maintained for some time, will do much towards the restoration of the power of the muscles paralyzed.

Strychnine has been experimented with, and, as is affirmed, with gratifying results. Veratrine, also, we are told, has been successfully used. Cases of cure by the nitrate of silver, in large doses, have been reported. Cold affusion has been of obvious service, in some instances, with stimulating frictions, and bandaging. Electricity and galvanism seem to me to be clearly indicated, and I indulge much favorable expectation from their energetic employment.

CHOLERA.—Sydenham has given of this disease—commonly called by a strange pleonasm (perhaps emphatically, "morbus," as "the disease" par excellence) *Cholera Morbus*—a description at once so vivid and so faithful, that it is copied by most writers, as admitting scarcely of amendment or addition:—"Vehement vomitings, and difficult and painful dejections of ill-conditioned fluids; agony and inflammation of the intestines and abdomen, cardialgia, thirst, a quick pulse often small and unequal, heat and anxiety, nausea and colliquative sweats, spasms of the arms and legs, fainting, coldness of the extremities, and other symptoms of great danger, which terrify the bystanders and kill the patient in twenty-four hours."

The picture thus drawn is truly fearful to contemplate; but far from being in any degree overdrawn, it rather falls short of the real horrors, which attend the disease in its worst and most aggravated forms. I have myself seen fatal terminations in common or sporadic cholera, in eight, and twelve, and twenty hours. And in the *malignant cholera*, which originated in India, but with which the whole civilized world has, alas! become but too familiar, death has not unfrequently happened in from four to seven hours, or even in a shorter period of time; the constitution being at once struck down or paralyzed by the causative agent, and deprived of all powers of resistance, as from the effect of the more intense poisons.

It will be perceived, from these remarks, that I am not unwilling to recognize or acknowledge for convenience sake, this common appellation of the two forms of cholera, so constantly distinguished, in speaking of this subject. But, indeed, no one can hesitate to admit the necessity of such a distinction. The ordinary *sporadic* cholera is one of our most frequent maladies. Although not without its alarming appearances and real terrors, yet its proportional mortality is certainly within the average limits of other serious disorders of the same season and climate. Its causes are, for the most part, definitely known and easily avoided.

Not so, however, the malignant or *epidemic* cholera, which is easily traced through a brief but most extraordinary existence. Its history presents some of the most impressive phenomena that have ever been recorded. No form of pestilence has ever exceeded it in mortality. Its causes are unknown, undefined, and present topics of angry and unremitting discussion.

Whether or not, therefore, we assume the identity of these two modifications of cholera in nature and pathology, we must allow that the question of *cause* is still unsettled. I shall proceed, on that account chiefly, to treat of them under the separate heads of Common or Sporadic and Malignant Cholera.

1. *Sporadic Cholera.*—The cholera morbus of vulgar language, generally makes its attack at night, or rather early in the morning. It commences with restlessness and oppression at the stomach, which rapidly increases to nausea, and brings on violent and repeated vomitings. A griping attends early, with a feeling of distension and twisting of the bowels; the retching produces an irresistible propensity to stool, and the contents of the alvine canal being discharged, large and thin evacuations are thrown out with great force, and extreme severity of intestinal pain. The pulse becomes weak and frequent, the skin is bedewed with sweat, and soon becomes cool and relaxed; there is great prostration of muscular strength, with remarkable depression of spirits. This anxiety and dejection are followed by a light wandering or delirium. The painful and involuntary contractions of the stomach give rise to similar cramps of the abdominal and other muscles, adding infinitely to the agonies of the sufferer.

These symptoms, if progressing unrelieved, may so far debilitate the patient, that death may at once occur from the sinking produced by the immoderate evacuations upwards and downwards. Yet even when these are checked or have subsided spontaneously, another train of circumstances will often be pressed upon our attention. The patient, after a short sleep, perhaps, which seems in some measure, to have restored his exhausted energies, recovers the usual temperature of his surface, and loses the haggard and ghastly expression of countenance so often a trait, even of the milder forms of this terrible disorder. His skin regains its warmth, and becomes dry and ruddy; but the reaction thus exhibited, does not stop at this proper point. The cheek flushes darkly—the eyes sparkle and are suffused—the surface is harsh and hot—the abdomen is a little tender on pressure, and fuller than natural; there is propensity to stool, but without evacuations, or only a very small quantity of mucus is discharged. The epigastrium also betrays some soreness, with heat and thirst, and in the course of a few hours, a well marked gastro-enteritis is fairly developed. The attendant fever generally assumes a low typhous type, with red lips and mouth, and dry tongue, with gloomy muttering delirium and jactitation.

Causes.—A large majority of the cases of sporadic cholera which we meet with, may be traced directly to proceed from crude ingesta, such as indigestible and undigested articles of food, which irritate the stomach and intestines. This is most likely to occur when any improper aliment is taken at supper and just before going to bed. There are certain kinds of food which seem particularly apt to disturb the stomach in this manner; as shell-fish, and, indeed, all fish, to those who use them rarely as diet; unripe fruits; vegetables insufficiently prepared by cooking; meats which have commenced to decay; vegetables in a similar condition. Certain vegetables are in themselves irritating and dangerous. I have twice known violent attacks of cholera follow the swallowing of very small portions of mushroom, considered edible. Fruits brought to market in cities for sale are generally plucked immature, and undergo an imperfect maceration or softening, instead of ripening properly; hence it is, perhaps, that fruit so often produces cholera, especially when indulged in in any large quantity. Occasionally, a transient cholera follows the administration of many of our medicines—as gamboge, colchicum in free doses, sulph. sodæ, and the antimonials.

It arises, also, under circumstances which forbid us to refer it to anything taken into the stomach, being undoubtedly attributable to a morbid impression sympathetically transferred to that susceptible organ. Exposure to sudden changes of atmospheric temperature; to cold and moisture; sitting in a current of air at night; getting the feet wet; remaining in damp clothes—are among its causes. It often supervenes upon repelled eruptions of whatever character, and follows sudden and careless exposure after the subsidence of the exanthemata—measles especially. Of this last-mentioned kind, was the most promptly fatal case I ever witnessed in an adult.

Dissections show various conditions of the stomach and intestines, in accordance with the duration and violence of the atttack. If it terminate rapidly, the fatal issue seems to be brought about simply by prostration of the strength of the patient, and exhaustion of the vital energies; and here we can find no trace of any lesion. I have examined subjects dying under these circumstances, and have found all the viscera in an entirely natural and sound state, the villous coat of the stomach and small intestines being just tinged with the slightest imaginable blush, not more than one would readily believe to be altogether consistent with perfect health.

Where the case has been protracted, all the changes which follow inflammation of the mucous surface in its several stages are detected. The abdomen is often greatly distended, and the peritoneum sometimes found to contain a considerable secretion of a curdy or purulent fluid. Unequivocal marks, too, of cerebral congestion, and inflammation of the brain and its membranes, are not unfrequently met with, especially when the irritative fever has existed for any length of time, or has been more than ordinarily developed.

From time immemorial, it has been the fashion to attribute attacks of cholera to disturbance of the stomach from bile, secreted in inordinate quantities or variously vitiated in quality, and the practice everywhere resorted to was in general accordance with this view of the etiology. The offending fluid must be dislodged from whatever portion of the alimentary canal it might be imagined to be lurking in; must be got rid of by whatever means were most efficient; and the poor patient, already exhausted by the repeated evacuations upward and downward, was still urged by emetics, diluents, and cathartics, until he sank too often (as might have been expected) into the repose of death. It is hardly necessary to say here that such gratuitous assumptions no longer guide us in these later days of more enlightened pathology; we no longer set ourselves importunately to solicit bilious discharges. The secretion, so far from being the exciting cause of the alvine irritation here, either by its undue abundance or its morbid properties, is, for the most part, obstructed in a greater or less degree; nay, it would seem, in many instances, entirely suspended, the evacuations being thin and colorless, consisting principally of serous and mucous effusions, mingled at first with the contents of the canal and afterwards unmixed. Yet I would not go, with Johnson, to the opposite extreme. I would not affirm this obstruction or deficiency of bile to be a matter of regular and uniform occurrence; nor consent to regard it, as he seems disposed to maintain, as a constant attendant, or an essential constituent, if not absolutely the cause of the attack. On the contrary, we meet not unfrequently with violent cases in miasmatic regions, and through the hot months of summer and of autumn, during the prevalence of what are styled bilious disorders; nor can I conceive any reason why a vitiated secretion from the liver, poured into the duodenum, should not prove, by its acrimony, like other irritating contents of the abdominal canal, a cause of cholera. Indeed, I have been satisfied, in more than one instance, that this was the actual state of the facts, and that the cases deserved the appellation which has been assigned to designate one species or variety of the disease—*bilious cholera.*

The general *prognosis* in sporadic cholera is, as has been already stated, rather favorable than otherwise. The cause which produces it is, for the most part, transient. Irritating ingesta, of whatever nature or quality, can scarcely fail to be promptly removed by the vomiting and purging which they have excited, and the irritation to which they have given rise gradually subsides. The patient sleeps, and awakes refreshed and restored. In feeble constitutions, the injurious influence exerted by the causative agent is, however, sometimes so intense as to prove immediately fatal. I have seen a child sink thus from an overdose of emetic tartar; and another vomited and purged to death in a few hours after eating an orange. Yet the ordinary mode in which the unfortunate result is brought about is by the supervention of gastric or enteric inflammation, and sometimes by a similar affection of the brain and its membranes. Any symptoms, therefore, which indicate these tendencies, augur unfavorably for the patient. Tenderness on pressure, tumefaction of the abdomen; a return of vomiting, accompanied with febrile excitement; redness or soreness of the tongue, lips, or mouth; headache; a dark flushing of the cheek; a low muttering delirium, with great thirst—these are all tokens of impending danger, and require special care and assiduity.

The *treatment* of cholera requires to be modified by the cause which has brought it on, as well as by the condition and circumstances of the patient. If present at the very commencement of an attack, preceded by a full meal, or by the use of articles of diet of difficult digestion or of dangerous or improper quality, it will be best to empty the stomach at once of its deleterious contents by a mild but efficient emetic. Ipecacuanha deserves, I think, an unhesitating preference, on account of the gentleness of its operation, its well known relaxant or antispasmodic influence, and its diaphoretic powers. If it fail to act, or act slowly, the sulphate of zinc may be substituted. Should any alvine uneasiness remain after the vomiting, an enema may be given, or a very mild cathartic administered, as castor oil, to those who bear it well, or a proper dose of calomel with opium.

These observations, and this practice, it is evident, will not apply in cases originating from any other cause than irritating ingesta, as exposures to cold or moisture, or malaria, or from mental emotion, and the like. Besides this, attacks of ordinary cholera are not generally alarming at the onset, and the physician will seldom be sent for, or, if sent for, will hardly reach his patient before he has been pretty thoroughly evacuated both upward and downward. In addition to the oppressive nausea and propensity to stool, he now labors under severe spasmodic pain, not only in the stomach and bowels, but in the abdominal muscles; nay, even those of the legs and arms, the hands and feet, are affected with annoying and distressing cramps. He is sensible of the utmost degree of weakness, and disposed to syncope—perhaps faints outright after an evacuation; and mutters indistinctly and incoherently.

Here we are presented with two plain indications, which require to be fulfilled with the utmost promptness and decision. We must subdue irritation, which has not only brought on profuse secretions from the vascular surfaces affected, but has also excited spasmodic contractions of the muscular structure of the digestive tube in the first instance; and, secondarily, by sympathetic associations in all the sets of muscles over the whole body, both voluntary and involuntary; and we must support the vital energies of the sick man, now in the most imminent danger of being exhausted, as well by the intolerable pain he endures, as by the loss of fluids effused from the vessels.

Happily these, our objects, are not only perfectly compatible with each other, but the accomplishment of the one is best promoted by the very means which we must resort to to effect the other. Opium—magnum Dei donum, is here our chief reliance, and a remedy of inestimable value, perfectly efficient alone to remove the disease in a large majority of cases. I prefer, as Sydenham did, "liquid laudanum," to any other of its preparations. It is true, as affirmed by many writers, that a pill (from its form), will sometimes be retained when any fluid is promptly rejected; yet, nevertheless, the tincture, even when thrown up, will often be found to exert a more soothing influence than a pill retained. And this apparent paradox is easily explained. The nerves of the disturbed stomach are at once impressed by, and admit the anodyne influence of the fluid opiate, as it comes in contact with, and washes over, their sentient extremities; while the pill remaining undissolved, or dissolving slowly, in the fluid contained in the cavity (corpora non agunt nisi soluta), produces an effect proportionally slow and imperfect, perhaps acting in the meanwhile, by its bulk and hardness, as an additional cause of uneasiness and disturbance to a surface whose sensibilities are excited to the highest degree of morbid intensity. With these views, I do not confine myself to measured doses of the opiate, nor restrict myself to any limit of regular interval in its administration. To an adult, I usually give at once a teaspoonful of laudanum in a little water, and repeat this quantity with a frequency proportioned to the urgency of pain and vomiting. If, as will sometimes happen, the expulsive action of the stomach is so stormy and incessant, as not to allow of anything being taken, the effort to vomit being consentaneous with, and absolutely overcoming, the attempt to swallow, administer the opium by the rectum; throwing up an enema, composed of a small quantity, not more than an ounce or two, of some cold mucilaginous fluid—starch, gum Arabic water, or the like, with two or three teaspoonfuls or a tablespoonful of the tinct. opii, and let this also be repeated with a frequency proportioned to the urgency of the symptoms. In the meanwhile, apply warm poultices with mustard to the epigastrium and extremities, and let the belly be well fomented with hot spirits and laudanum, bladders or bottles of hot water, or hot bricks, being kept to the soles of the feet and the thighs. If the strength yield, add to the opium some stimulant and nutritious fluid—arrowroot with brandy; or if this be not retained, small doses of ether or camphor may possibly be less likely to be rejected on account of their smaller bulk.

In some cases, all stimulants will be refused by the patient, as augmenting the uneasiness and discomfort which he suffers at the stomach. His thirst will lead him to ask for cold fluids and ice, the latter of which is not only a most grateful and pleasing indulgence, but is actually, in a high degree, remedial occasionally, and, as far as I can judge, unlikely to do any injury. I am in the habit of allowing its use almost ad libitum, and have never yet seen any evil result from it.

By these means, as above recited, we shall generally succeed in allaying the particular irritation of the stomach and intestines, in which cholera consists, and having thus checked the inordinate secretions, which were poured out from the immense mucous surface affected, and obtained a suspension of the convulsive and spasmodic actions which threatened the immediate destruction of life, we may, in common cases, consider our task as accomplished, and leave the patient to the enjoyment of quiet and repose, advising him to remain at rest, and enjoining, for some time, strict abstinence from everything but the smallest portion of some mild, light, nutritive fluid at proper intervals.

We are not always, however, thus fortunate, and will occasionally meet with instances in which our success will prove to be less complete. Whether from a more than ordinary intensity of cause, or peculiar susceptibility of constitution, or from other circumstances more or less obvious, we will sometimes find our patient, instead of continuing to improve, begin or persist to complain of uneasiness or weight at the pit of the stomach, with a sense of heat or tenderness on pressure. He is thirsty; the skin becomes harsh and hot; there is restlessness and tossing, and the abdomen feels sore and distended. The case has now assumed a new character. A subacute gastro-enteritis has obviously supervened, and requires appropriate management.

It is not necessary or proper to occupy space, by repeating here what has been already said of the treatment of that modification of disease. I will only add, that my principal reliance is placed unhesitatingly upon the combination of calomel with opium, so often and so justly eulogized. "Calomel," says James Johnson, "must never be omitted, because it answers here a triple purpose; it allays the inordinate gastric irritability, it excites the action of the liver, and it corrects the constipating effects of the opium; so that, when the spasmodic orgasm is over, some gentle laxative may with it carry off the diseased secretions."

2. CHOLERA MALIGNA—*Epidemica—Asphyxia—Asiatica—Indica; Hyperanthraxis.*—This malignant and terribly destructive malady first showed itself in Hindostan in 1817, spread with fearful rapidity over the whole of Asia, depopulating some of the most flourishing and thickly inhabited districts of that most ancient quarter of the globe, and has since become familiar in both America and Europe.

It made its appearance as an epidemic, and diffused itself with a sway more potent, and an influence more extensive than had ever been known in any former example. It has prevailed to a degree equally violent in all climates, and in every season of the year; in regard to temperature—from the frosty atmosphere of Russia and Norway (from September to January, inclusive), when the thermometer had sunk below zero, to the burning plains of British India, when the mercury stood above 100° of Fahrenheit; "in regard to moisture—during the continuance of rain for months, to that dry state of the air which scarcely leaves a vestige of vegetation on the surface of the earth."

It has not been observed to follow the course of prevailing winds or currents, but in this, as in all other respects, seems independent of all sensible influences. It often selects, for peculiar prevalence, portions of country of high repute for salubrity, and passes by low and unhealthy regions. Not the least impressive of its features is the unaccountable suddenness of its appearance and disappearance. In one of the English regiments at Bombay, it showed itself on the 21st of September, and committed dreadful ravages before night; on the 25th it had abated remarkably, and in three days more had vanished entirely. As a general rule, however, it seems slow to leave altogether a position which it has once occupied, occasional cases continuing to recur from time to time.

Symptoms.—In the history of malignant cholera, we are presented with certain prominent phenomena which deserve special attention. It is alleged, plausibly, that none of these are new features; nor do they indeed afford us such lines of regular or exact division as may seem clearly to distinguish in all cases the Asiatic or epidemic, in its early stages, from ordinary sporadic cholera. Nay, it is probable that each of them may have been now and then met with in an insulated and severe example of cholera morbus, popularly so called. But here they occur in masses, and present themselves with great uniformity during the reign of the epidemic. In deference to the views of the best authorities, I will describe the disease as offering *three stadia* or periods, separable without difficulty, and demanding a notable difference in the treatment properly adapted to each.

1. The incipient, by some called the premonitory stage. In an immense majority of cases, a diarrhœa precedes the other symptoms of cholera. It is attended with languor and sometimes nausea. The discharges at first consist of the common contents of the bowels, then become thin and watery, and finally assume the serous appearance

regarded as characteristic. They are apt, from the beginning, to be very copious, and pass easily without much griping, and are followed by great weakness, the pulse being slow and feeble. This condition of things lasts, in different individuals, from a few hours to four or five days.

2. The purging is now attended with oppressive nausea and frequent vomiting of a similar thin or serous fluid. The patient is apt to be thus attacked at night, or towards morning. Cramps, first of the stomach and intestines, and afterwards of the muscles of the body and limbs, come on at brief intervals, and are productive of intolerable anguish to the unhappy sufferer. After the spasmodic or convulsive vomiting and purging have continued a short time, not often beyond eight or twelve hours, the evacuations are less frequent and profuse, and the patient sinks into a state of collapse. His pulse, which has gradually become more and more feeble, is now scarcely, if at all, perceptible. The skin is cold and pale, or even livid, bronzed or blue, and covered with a clammy sweat; while a sense of distressing heat, and of thirst, is often complained of. The hands are icy cold, and the skin of the fingers is sodden and wrinkled, as if long soaked in water. The tongue is moist, pale, and colder than natural. There is a feeling of weight and oppression at the præcordia. The voice is feeble and husky, and this whispering tone is considered by some as characteristic, the "vox cholerica." The face is haggard and hippocratic; the features shrunk and wan; the eye hollow. A peculiar appearance of this organ is described by Magendie, who has laid greater stress upon it than any other writer. "The sclerotica," he says, "becomes transparent, as in bodies some time dead, giving a most ghastly and corpse-like appearance to the sick." The respiration is slow; the mind usually clear throughout; the secretion of urine is often absolutely suspended, and also that of the bile. Few survive who have fallen into this extreme condition. In milder cases, whether from the inferior vehemence of the attack, the greater energy of the constitution, or the success of the remedies employed, the vomiting and purging subside, the diarrhœa ceases, the cramps abate, the tongue and skin grow warm, the pulse is fuller, the secretion of urine is resumed, bile is discharged by vomiting or purging, and the patient recovers; but he does not at once pass into a state of perfect health.

3. A third stage of this dreadful malady ensues, which has been differently regarded by different writers. The majority consider and style it a consecutive fever, excited by the vehement irritation of so many organs or tissues as have been affected, or, perhaps (like the febrile disorder, so often consequent upon large losses of blood), as the result of an inordinate and ill directed reaction, after the prostration and exhaustion from the discharges which have taken place. Others, however, look upon cholera as a distinct type of fever, of which the former symptoms are merely the initial or cold stage, and this the hot or principal stadium. The patient now complains, perhaps, of headache; his eyes are suffused and intolerant of light; the skin becomes dry and hot; the pulse fuller than before, assumes some tension and frequency; the tongue is clean, and red, and hard, and dry; afterwards

with the teeth and lips becoming incrusted with sordes; there is often a low muttering delirium; in short, the description of typhus mitior applies, with certain modifications, to these cases, which it should be remarked, occur more frequently in some of the localities, invaded by cholera, and in some seasons than in others. Nay, a few writers declare that they have failed to meet with any example of this sort. It was certainly rare in India, the original seat of this pestilence; so much so, that after it had invaded Europe, Dr. Russel, one of the physicians sent by the British Government to Russia, to acquire information concerning its existence and history there, remarks that this consecutive fever was "a new feature to him," while he, nevertheless, asserts most promptly and definitely the identity of the epidemic, with that known to him familiarly on the banks of the Ganges. It was, perhaps, most general in France and Russia, less so in England (though Brown asserts that he always met with it), and still less so in this country. Instead of it, we meet not very unfrequently, with a strange and peculiar condition of the sensorial system. The patient is drowsy, but not comatose; dull, but not incoherent. "I feel no pain nor sickness," said a negro patient to me. "I am only sleepy, and I'm afraid I shall die that way," as indeed he did. The pulse is slow and full, but not hard; the pupil somewhat dilated; the tongue and mouth dry, with thirst. The breathing is generally easy, but sometimes stertorous, with occasional moaning and muttering, and almost always very slow. The patient requires to be spoken loudly to, or shaken, to rouse him, but when awaked, speaks clearly, and sometimes promptly, and with alacrity. The stomach and bowels are generally tranquil, in this stage; the strength is exhausted, so that if the body is raised from the recumbent posture, the pulse fails, the jaw falls, and the skin becomes covered with sweat, with every other sign of extreme prostration. Blood when drawn is very dark, coagulating slowly, with little or no serum. This condition is not described, so far as I know, by more than one writer, Dr. Kier, of Moscow, who regards it as a "congestive subinflammatory state of the brain and spinal cord."

It would be tedious to describe the frequent anomalies, which are exhibited through the course of so horrid a pestilence, or point out the numerous varieties of mode in which the malady makes its dreaded assault, or in which death seizes on his devoted victim. Some die at once, probably from spasm, without either vomiting or purging; their torments ending in less than an hour. Others sink gently, exhausted by a painless diarrhœa.

Convalescence is usually slow and irregular. Great irritability of the digestive tube remains for a long while. The hair falls off; the voice continues rough and weak; the whole body is feeble and emaciated, and in many instances, the patient seems to have rapidly grown older by many years.

Prognosis.—In no disease is the proportional mortality greater on the whole. It is true, that in particular localities, it has assumed comparatively a less murderous aspect. It is true, that by proper attention to the wants of the sick, and prompt, and skilful, and assiduous employment of remedies, many lives are saved. It is true, also, that many physicians claim to have enjoyed, in their peculiar modes of treatment, a degree of success that would be utterly incredible, even if affirmed of the most common and slightest ailments—a mere cold, a colic, an intermittent fever. Yet, notwithstanding all this, the ratio of deaths in epidemic cholera is truly frightful, varying from seven to fifty and even seventy per cent., if we select for the basis of our calculation, documents not totally inadmissible from exaggeration. Well, then, might the French physiologist have applied to it, when he first examined its appalling features, the phrase which has since become so familiar. After his visit to Sunderland, Magendie being asked what he thought of cholera, declared that "it began where all other diseases end—in the death and cadaverization of the patient." Verrollot tells us that when it invaded the Steppes of Tartary, the nomadic tribe of Kalmucks—"the type of man in robust health"—lost fifty or fifty-one per cent. of the sick.

The individual prognosis seems to be drawn, most clearly, from the degree of collapse. This condition (which I regard as a mode of capillary paralysis), is, when exquisitely formed, an absolutely hopeless state, and the degree of its intensity is a very accurate measure of the danger. Even if the patient do not die in collapse, he is likely to fall into a secondary or consecutive fever, of proportional violence or risk, or emerge into the strange condition of sensorial torpor, attempted to be described above. The vomiting and purging are not to be dreaded so much, it seems, as was first imagined. The suppression of urine is a very bad symptom; so also is a marked coldness of the tongue and mouth, and the sodden appearance of the hands and feet. Vascular reaction and the return of deficient secretions and excretions, as of bile in the evacuations, and of urine, afford us the best hope of recovery.

The *diagnosis* can only refer to the line of distinction which we may be called on to draw between sporadic and epidemic cholera. In the earlier cases of invasion, this may be attended with some difficulty. The characteristic circumstances have been dwelt on. The prompt tendency to immediate failure of the circulation, whence the phrase cholera asphyxia; the collapse or capillary paralysis, shown by coldness and shrinking of the surface, coldness of the tongue, and blueness or lividness of the skin; the total absence of bile from the evacuations and their peculiar character as albuminous, resembling so remarkably thin gruel or rice water; the violence of the spasms; the rapid emaciation; all these form a picture which can never fail to be immediately and clearly recognized.

Autopsy.—The external appearance of the body is striking. The solids are shrunk with seeming emaciation, not so much attributable to absorption of the fat, as to the previous draining of the fluids. The surface is livid, bronzed or blue; the skin of the hands and feet corrugated; the nails purple; the fingers often rigidly contracted by spasm, which may, indeed, continue to affect the various muscles several hours after death, in cases of short duration. The arteries are empty, nay, this is the fact in some instances, before death; the radial and even the carotid, having been cut open without the escape of a drop of blood from their gaping orifices. The cutaneous veins not unfrequently refuse to bleed, when pierced. The mass of blood seems to be collected in the large veins of the trunk and viscera. The blood has undergone some remarkable changes. It is black and viscid; if it coagulate at all, it does not separate into its usual constituents; having lost, by the inordinate serous evacuations, much of its water, and its peculiar salts.

The morbid appearances of the viscera differ, relatively to the duration of the case. The vessels of the brain are usually found full, though not uniformly so. In the thorax, the lungs are much congested or loaded with blood. The heart is generally distended with blood, on the right side and sometimes on both, and sometimes even the aorta is thus filled. The veins in the neighborhood of the heart are uniformly much engorged. The veins of the abdomen, of the liver and mesentery, especially, are distended.

If the fatal event have occurred early, we shall discover few or no marked changes; a slight redness of both the serous and mucous surfaces, has been noticed, but in general, it is stated by writers, that there is presented very little trace of disease. On the contrary, in protracted instances, notable alterations are found to have taken place. The brain shows its vessels filled and turgid, in cases that have exhibited the symptoms of consecutive fever; sometimes with serous effusions between the membranes. The lungs are rarely altered in structure even where respiration has been much affected during life. They are, however, sometimes hepatized and sometimes unaccountably collapsed. In the abdomen, a certain degree of redness and turgidity is perceived, over the peritoneal covering of the intestines; they sometimes adhere from inflammation. The stomach is (rarely) found empty and contracted. The mucous coat is so variously changed as to offer a great diversity of appearances. There are tokens of congestion and of active inflammation in different parts; it appears softened, thickened, friable, and Scott says, sphacelated. The intestinal tube is sometimes collapsed but more generally filled with air, or with the rice-water fluid, described as forming the principal part of the evacuations; its internal surface sometimes shows the marks of active inflammation. The urinary bladder is found empty and much contracted, but not diseased. Briere de Boismont affirms the spinal marrow to be uniformly affected; sometimes, he says, there is effusion of blood, sometimes of serum and sometimes of gelatine in the canal. Dr. Schnurrer notices a peculiar feel of the bowels. "They have lost," he says, "their usual polish; they are flaccid and yielding; the mucous membrane is doughy and the submucous tissue congested. Although, for the most part, cholera corpses are rigid, yet Dr. Davy has, in some cases, found the muscles extremely flaccid, as in animals killed by fatigue or electricity.

Professor Horner describes the following morbid anatomical characters as found in the alimentary canal. "1. A copious vesicular eruption, entirely distinct from the tumefaction of villi, muciparous follicles or glands, and which pervades the whole canal. 2. A lining membrane of coagulated lymph, which exists in the small intestines at least, if not in the stomach and colon also, and resembles in texture and mode of adhesion, the membrane of croup. 3. Vascular derangements and phenomena, which are confined almost exclusively, if not entirely so, to the venous system. 4. An exfoliation of the epidermic and venous lining of the alimentary canal, whereby the extremities of the venous system are denuded and left patulous."

Rostan found "the eyeball shrunken, with deep ulcerations of the cornea; the serous membranes dry and pitchy, with albuminous shreds adhering to their surfaces; and a granular eruption of the intestines, the psorenterie of Serres."

The stomach and bowels are often found filled with a serous or gelatinous fluid, identical with that discharged by vomiting and purging. The quantity thus excreted is supposed to account for the defect of serum and the salts dissolved in it, in the blood of choleric patients. Andral, Favre, and Taylor deny, however, the albuminous nature of the cholera evacuations. They are loaded with epithelial scales, of both the tessellate and cylinder variety, in such quantity as to account fully for their opacity and rice-colored look. Dr. Burnett detected in the same fluid crystals of oxalate of lime. The urine sometimes contains sugar, sometimes albumen.

The *history* of the progress of cholera from the place of its origin is extremely interesting, but would occupy too large space to be given here in detail. It gradually approached Europe through China and Asiatic Russia, occupying twelve years upon that part of its route. In less than two years more it invaded France and England, where it prevailed in 1832. From Great Britain its transmission to this continent was easy and prompt. It made its first appearance at Quebec, in the same year, whence it ascended the St. Lawrence, to Montreal. From that city it followed the divided stream of emigration westwardly along the lakes, and southwardly across to the Hudson River, and to New York. From this time it spread in all directions. Charleston did not suffer from it until 1836. It seemed to die out in the United States entirely in 1837, and an intermission took place of nearly or quite eleven years.

Again it revived in Asia, in 1844, and began once more to extend itself westwardly, following very nearly the same route as on its first visit. It pervaded Russia in 1847, and its march became more rapid as it approached the seats of progressive civilization. In 1848, it prevailed in Europe, and did not long delay its expected return to our shores. It reached us in November, 1848, simultaneously at the two points of greatest immigration, New York and New Orleans. There is reason to fear that it may become thoroughly naturalized, and, like other forms of imported pestilence, smallpox, hooping-cough, scarlatina, and yellow fever, a permanent resident, and a fixed denizen of our country.

Of its origin we know literally nothing. Of its mode of progress and propagation we have, unhappily, learned much. It follows the great lines of human intercourse. It goes forward at varying rates, but undeniably exhibits a speed of movement accordant with the average mode of travelling, wherever it appears. In the east it is slow, keeping pace with the pedestrian, the camel, and the boatman; in Europe and America it sweeps along with the steamship and the locomotive. It breaks out sometimes suddenly and unexpectedly, but never arises spontaneously beyond the limit of possible and explicable transmission from a previous locality. It spreads at times with a rapidity unheard of, and unequalled, except in the history of influenza. Of its propagation by means of the diffusion of a specific materies morbi, there is now no reasonable doubt.

The proofs of this communicability, and of its actual transportation are abundant. Without any details, the mere fact of the repeated *coincidence* of the arrival of infected vessels, with cholera on board, and the immediate breaking out of the pestilence in places previously healthy, is quite sufficient; and these coincidences are now multiplied and become too numerous to be explained away by the most ingenious special pleading, and too well known to be questioned or denied. It appeared in Quebec, in the memorable year 1832, just after the arrival of the brig Carricks, with sick emigrants; it is traced with and by them up to Montreal, and along the lakes with the steamers that transported them. In New Orleans, it broke out immediately after the arrival of the steamer Constitution, as we learn from the official report of Surgeon-General Lawson. The brig Amelia was wrecked on Folly Island, October, 1832, near Charleston, with some sick passengers, who were landed there. Of the four negroes, sole residents there, three died of cholera, which was not known to exist at any point nearer than New York, seven hundred miles away. The same fatal coincidence attended the advent of the Topaz, at Mauritius, the Pic Var, at St. Dennis, the Carolina, at St. Francisco. Whenever it crosses the sea or reaches an island, the place of its first appearance has uniformly been upon the coast.

In December, 1848, after an interval of eleven years, the disease reappeared in this country—in two places at once—and in both *coincidently* with the arrival of infected vessels; the New York, at Staten Island, the Swanton, at New Orleans.

Between these, its first and second visits to this continent, California had become a portion of the United States, and the great flood of emigration had set across the isthmus which separates the Atlantic from the Pacific, by the route from Chagres to Panama. Here, also, followed the dark stream of pestilence. "At the close of the year 1849," says Dr. Duchaissang, "some American ships arrived at Chagres with the cholera raging on board. The disease spread in Chagres, followed the route taken by travellers, invaded Cruces and Gorgona, on the isthmus, and made the greatest ravages in Panama; but it did not spread anywhere into the towns and villages of the isthmus off the route. But there is, besides this line, a continual trade between Chagres, and Santa Martha, and Carthagena, on the Atlantic coast, and ascending the river Magdalena as far as Santa Fe de Bogota. The epidemic followed this line also. Passing from Chagres to Carthagena, it reached Santa Martha, where I then resided; then went up the river, the only route open to commerce, devastating Baranquillas, Minpor, Hondas, all the villages on the banks of the river. In all this course it did not extend to the towns and villages lying out of the commercial routes."

"On the Pacific, it spread from Panama to Mazatlan and Acapulco, the very places where the steamers plying to St. Francisco used to touch."

It is as easy as unnecessary to add to this catalogue of instances in which the coincidence I have dwelt on has been observed to take place.

As to the direct contagiousness, the personal communication of cholera, there has been no less bitter controversy. I feel no inclination to enter into a dispute which promises to last, like all our other discussions, as long as our profession exists. There seems to me to be as much evidence of the contagious character of this malady as can be adduced to prove that of any other form of disease in which no palpable contagious matter can be found and made use of for the purpose and test of inoculation; such as hooping-cough, mumps, typhus fevers, and so forth.

We know many circumstances which increase, perhaps, the chances of its invasion, certainly augment its violence and proportional mortality, and probably promote its spread. Generated at Jessore, it is, doubtless, favored by contingencies similar to those which exist at its birthplace, and presided at its origin. But these contingencies do not produce it—have not produced it anywhere else. It exists in a thousand localities altogether independently of—nay, in absolute opposition to them. Low residences, density of population, poverty, heat, filth, alluvial soils, dampness, all these things are favorable to it. But if New Orleans and London lie flat on the banks of the Thames and the Mississippi, Nepaul is four thousand feet above the level of the sea, and Mexico seven thousand, where, in 1850, there died of cholera in one hundred days, eighteen thousand people; and Landohr, eight thousand. If the crowded cities of Europe and Asia were specially assailed in their closely packed courts, lanes, and alleys, so, also, were the Arabs in the desert, the Kalmucks on the vast steppes of Tartary, and the traders upon our wide western prairies. If the muddy delta of the Ganges, and that of the Father of Rivers suffered, so did the granite hills of Staten Island, the volcanic soils of Naples and Palermo, the limestone ranges of Kentucky, and the sands and rocks of Algeria. If dampness aid it, the utmost aridity does not check it, as witness Mecca and Medina; the dryest air is probably that which is too cold to hold in solution any moisture; and if heat foster it, we find it, nevertheless, at Moscow, when the thermometer was at 2°, and at Bergen, in Norway, in January, when the mercury was continuously frozen. If the poor die of it, the rich do not escape it. If filth promote it, still the most scrupulously cleanly are liable to it.

Nor would it be at all difficult to collect a volume of instances in which special contagious communication from the bodies of the sick and by means of fomites, is as clearly shown as in analogous cases of any other form of disease whatever. They may be found in abundance in the writings of Copland, Graves, Laycock, Watson, Simpson, Holland, Alison, Hooker, and Byrne.

Much has been written of the assignable causes of cholera, besides those included, as above, under the general heads of epidemic distemperature of air, contagion, and infection.

It has been ascribed to the great source of periodical fevers—malaria—and, indeed, has been maintained by some ingenious and able writers, both in the old world and the new, to be nothing more than a mere modification of malarial intermittent. It is true that malaria reigns in Bengal, its low and swampy birthplace, and in many other localities which it specially affects, with perennial and powerful sway. But we must affix a new meaning to the word when we employ it to refer to an agency powerful in all climates and seasons, and every district of country. What similarity can exist between the telluric, atmospheric, vegetable, or mineral exhalations or impregnations of the marshy region of India, the bleak and frozen hills of Sweden, the sandy plains of Tartary, and the paved streets of London, Paris, and Boston?

Aerial animalculæ have been suggested by Neale and Mopjon. Atmospheric haze of various hue has been alleged to attend the march of the pestilence, though not uniformly; perhaps animalcular. Recent investigators confirm the suspicions of those who look with fear to the waters of infected places as full of injurious animalculæ. They affirm that, even if unseen at first, they are developed in these waters after a certain length of time, and exhibit poisonous or infectious qualities. Fungous sporules, of indefinite and invisible minuteness, are maintained, by Prof. J. K. Mitchell and Dr. Cowdell, to be the active sources of the production of cholera.

Food of various kinds has been accused of giving rise to it. Dr. Tytler attributes its origin and its spread everywhere to the use of rice. This notion seems to us absurd enough. Charleston and Moorshedabad have suffered comparatively little from cholera, employing vastly more rice of various qualities than is eaten either in Paris or London, Vienna or Moscow. Damaged rice, however, ranks with such improper articles of diet as have been justly considered among the most influential of *exciting causes*. Excesses of all kinds increase the susceptibility to it, and enhance its violence. This is especially true, as stated by every writer, of intemperance in the use of ardent spirits. During its prevalence, the employment of acrid and irritating ingesta should be avoided; flatulent vegetables, shell-fish, unripe fruits, and all aliments which tend to bring on attacks of sporadic cholera. Exposure to alternations of temperature, dampness, and coldness must be shunned. Flannel should be worn next to the skin, with thick, warm shoes and stockings. The apartments of the sick should be carefully ventilated, and their excretions immediately removed.

Of the *treatment*, I cannot, even now, venture to speak with much confidence. The accounts of the results of different modes of management are so various and conflicting, that it is exceedingly difficult to decide where truth and accuracy are to be found. The English East Indian surgeons, whose reports stand first in point of time, and exhibit great skill, ability, and success, if they saw the patient early in the attack, bled freely and largely, and then administered calomel and opium in full doses, applying warmth and counter-irritation, in every form, to the surface of the body and limbs. A similar mode of practice has been very generally followed in Russia, Great Britain, and in our own country.

The lancet has been indeed, by some practitioners, urged under circumstances the most forbidding, even during collapse. I should prefer to follow the general rule here. I would shrink from an attempt to bleed a patient in this condition of vascular debility; indeed, the blood will often refuse to flow, whether from vein or artery, when cut. The temporal has been divided, the radial, nay, even the carotid, and from its gaping diameter not one drop has issued. "The fluids are stagnant," says Magendie, pithily and truly. When there were spasms and gastric or intestinal uneasiness, with a pulse that would bear it, I would resort freely to V. S., and would not hesitate to repeat it, the same circumstances requiring and permitting it. Topical bloodletting is an unobjectionable remedy. I would use the cups in preference; applying them to the epigastrium, spine, and temples, *pro re nata.*

Opium I regard as indispensable. In mild cases, and in the early stage, it is often found to be the only medicine required. It has lost reputation in the hand of some practitioners, because, 1st, too much was expected from it; and 2d, it was misapplied. It was believed capable of curing all forms of the disease. It is not indicated in those attacks in which the stomach, struck torpid, fails to empty itself of its irritating and poisonous secretions. It is not sufficient in itself for the removal of the collapsed condition, nor is it adapted to the secondary stages of gastro-enterite and choleric fever, as it has been called; but, in a vast majority of ordinary invasions, it is most useful. It allays spasm; it soothes irritation, and diminishes the frequency and amount of the evacuations; it tranquillizes spinal and cerebral disturbance, and brings on quiet, and refreshing and restorative sleep.

Calomel is the article of the Materia Medica, perhaps, most universally exhibited. In all the stages of the attack, this drug has been prescribed, and in every varied quantity—from Ayre, of England, who gives repeated small doses of a grain or two every five or ten minutes, to Cooke, of Lexington, who, aiming at the maximum dose, offers a tablespoonful *pro re nata.* The preponderence of evidence in its favor is immense. I would administer from five to twenty grains, at such intervals as circumstances might indicate.

The acetate of lead, recommended by Graves, has been eulogized by several practitioners. I have certainly seen it do good service. I combined it sometimes with opium, and occasionally dissolved it in the mist. camphorata. It requires to be given in free doses to make any definite impression. It is useful as an astringent enema, when the discharges are frequent as well as profuse.

Emetics cannot be often applicable to ordinary cases. If the circulation became feeble early in the attack, with coldness and blueness of the skin, and collapse impended without great previous exhaustion from discharges, I would follow the authorities who advise a stimulant emetic; mustard seems generally to be preferred. Half an ounce to an ounce may be given, diffused in warm water; common salt is much used for the same purpose; other emetics, as sulph. zinci, ipecac., etc., are occasionally combined with them.

Every experienced practitioner, who is familiar with this terrible disease, advises (with but two exceptions that I am aware of), the earliest and most earnest efforts to restrain the precursory diarrhœa, so marked and constant as to be known by the title of *cholerine*. This is often an easy task. It suffices generally to put the patient to bed, and administer a full dose of opium in some form.

But of late, Dr. G. Johnson, an English physician, recommends a course directly opposite. He purges with castor oil freely, giving half an ounce every half-hour in water, and allowing cold water to be drank ad libitum. He thus saved, as he affirms, twelve out of fifteen attacked. The plan has been unsuccessful in other hands. A medical commission reports, after fair trial of it, sixty-eight deaths out of eighty-nine persons so treated. Dr. Stark had previously eulogized the cathartic practice still more heroically carried out; having selected croton oil and colocynth as the proper articles, giving a drop of the former with a moderate amount of the latter every hour, until a bilious evacuation is procured. Diluted sulphuric acid is meanwhile given to check the vomiting.

In certain prolonged cases, when a species of inflammatory affection of the stomach and bowels is developed, the milder articles of this class are occasionally beneficial. If calomel does not suffice, castor oil, magnesia, or rhubarb may be added in moderate doses. Of stimulants, properly so called, I should wish to avoid, if possible, the administration. If they become absolutely necessary, beyond opium, which is, incidentally, the best of them, I would use capsicum, camphor, and ammonia, in quantities proportional to the urgency of the case.

Heat is almost uniformly applied to the surface, though disputes have run high whether it ought to be in moist or dry form. Hot, dry air is extolled by one; vapor baths or hot water by another; and by still another, the body is directed to be enveloped in poultices, of as great warmth as can be borne. If the skin is relaxed, I prefer the dry form, and lay about my patient bags of hot salt, hot bran, etc. Mustard may be advantageously applied, in poultices or by dry friction, to irritate the surface. Nitric acid and capsicum, and a great variety of irritants, are used also as ointments and embrocations. In protracted cases, epispastics are of unquestionable service, both as stimulants and revulsives. Some practitioners, finding that these heating formulæ are so often complained of by patients as adding to their sufferings, have gone to an opposite extreme, and have advised cold affusions, and even friction with ice, upon the blue or bronzed skin, covered as it is with a chill and clammy perspiration.

Camphor has been proposed by Hahneman, upon homœopathic principles, as "the true and only remedy for cholera," and he ventures to assure any one, who will "take it in sufficient quantity, and with proper zeal and perseverance, that he will not die." The remedy has gained great celebrity in our own country, and is much employed everywhere as prophylactic. Large draughts of tepid water have been recommended, on the one hand, and on the other, a Dr. Hardwicke Shute has reported a prodigious success from the drinking of indefinite quantities of cold water exclusively. Broussais gives pellets of ice; Magendie, hot punch; Baird, of Newcastle, relaxes with the tobacco enema; Fyfe (of same place), stimulates with glysters of mustard and brandy. Sulph. quinine, nux vomica, galvanism, electricity, and acupuncture, have their advocates. Sir James Murray suggests the placing of the body in an exhausted receiver, to determine to the surface in collapse. The idea is plausible and ingenious; it is dry cupping on a large scale.

The blackness of choleric blood has induced the exhibition of oxygen and its mixtures, as nitrous oxyde, etc.; but the reports of the results of the experiments are not encouraging. Dr. Latta and others have injected into the veins warm water in large quantities, holding in solution the salts drawn off in the serous discharges peculiar to this disease. The attempt is a total failure. Dr. Stevens, who entertains peculiar views of the chemical changes of the fluids in disease, and of the paramount importance of saline remedies in fevers, has extended his treatment also to cholera; and the reports of the success of his plan in the management of the epidemic in the Coldbath Fields prison, London, were highly favourable. They have not, however, received any further confirmation from any quarter.

The highest degree of success, in the encounter with this terrible malady, that has yet been attained in this or any other country, is claimed for Dr. Cartwright, of Louisiana. His plan consists in the free exhibition of calomel, capsicum, and camphor.

It may be observed, generally, that in the doubtful and tentative management of this terrible pestilence, to which even the most sagacious and scientific physicians were driven, those prescriptions have obtained most reputation that contained all or some of the articles thus mentioned. Of these, perhaps, the capsicum was, at least, in the southern and southwestern parts of our own country, the most relied on, and has been combined with morphine, quinine, ether, etc. I was much pleased with a formula which I frequently exhibited, differing chiefly from Cartwright's in the addition of opium or morphine. The quantities of camphor, calomel, capsicum, and morphine, were carefully adapted to the age of the patient, and the apparent urgency of the case. If any symptoms of narcotism presented themselves, I omitted the opiate, and substituted ammonia.

Some authors have fallen into the error of attributing the cerebral torpor or comatose condition of the latter stages of cholera, to the previous use of narcotics. The fallacy of this notion is evident from the fact, that these tokens of sensorial disturbance have been most strikingly notable, and of most frequent occurrence, in those parts of the world where opiates were least confided in, as among the Broussaians of France, and the Homœopaths of Germany. But it is easy to satisfy ourselves on the subject by experiment. I saw this condition exquisitely developed in several patients, who had taken no stimulant, and to whom I had suffered no anodyne to be administered.

I repeat that I regard this pathological state as a part of the full history of cholera—as one, indeed, of its characteristic stages. It is not shown, of course, when the patient dies in the first or congestive stadium, or sinks, under the exhausting discharge of fluids, into collapse, or promptly fatal prostration, or is suddenly put an end to by vehement and universal spasm. Nor do we meet with it when we have been successful in arresting the progress of the disease or substituting remedial and healthy reaction and excitement, for the series of irritating and inflammatory lesions and obstructions to which its current tends. So, to compare small things with great, we may put an end to a paroxysm of intermittent fever, in the cold stage—the stage of incubation which ushers it in, or in the hot stage; by bringing on, in the first, a recuperative reaction, and, in the second a remedial instead of the impending morbid cutaneous determination and relaxation.

A western physician, Leczynski, recommends (in the *Western Journal*, Nov. 1852), chloric ether, in the dose of ʒss to ʒj every half-hour; and chloroform, which he administers in milk, 70 to 100 drops every quarter or half-hour. He tells us that 200 drops have been given at once, and successfully. It is adapted to prostration and collapse. "It stimulates, exhilarates, coagulates protein bodies, promotes the excretion of bile, soothes and produces a temporary anæsthesia of the voluntary apparatus, but an increased action of the ganglionic nerves, and the organs they enter." Being "energetically antispasmodic, it is indicated whenever a stimulant antispasmodic is wanted; it is contraindicated in plethoric and cachectic subjects. In the first it may cause apoplexy; in the second, it may decompose the already diseased blood to such a degree, as to make it entirely unfit for nutrition."

Strychnine was mentioned above among the remedies employed in cholera. Abeille regards it as "certain a specific here, as quinine in ague." He gave one-third of a grain in two ounces of water, four times in twenty-four hours. In combination it formed the favorite prescription of Professor Edwards and Dr. Howes in the epidemic of Cincinnati, in 1851. They exhibited "with remarkable success in the very worst forms of cholera, and even sometimes in profound collapse, the following formula: ℞.—Strychniæ, gr. ss; ol. terebinth. ʒij; mucil. gum acaciæ, ℥viij. M. S. One tablespoonful every half-hour until the discharges ceased, and the reaction occurred. In some of the worst cases, the dose was repeated every fifteen minutes. In one case, the above prescription was renewed seven times, and 3½ grains of strychnine given in forty-eight hours. In one case only was its poisonous effect noticed; in this 1½ grain had been given in sixteen hours." (*Trans. Am. Assoc.*, vol. v.)

Dr. Fuller considers sulphuric acid to be a specific in cholera. "One ounce of the 'dilute acid' of the *Pharmacopœia* is mixed with eleven ounces of water; of which one ounce and a half is given every twenty or thirty minutes, according to the severity of the case, until six or seven doses are given."

DIARRHŒA.

That disorder of the bowels which has received this significant title, is so frequent an attendant upon other diseases, that many writers, with the great Cullen at their head, have expressed considerable reluctance to give it place as a distinct malady in systems of nosology. I have not hesitated a moment on this point. Diseases are not palpable to us, unless as a series of cognizable symptoms, effects of certain definite causes; and it is in this combination of cause with regular and uniform effect, that each disease practically considered, must be allowed to consist. In the case now before us, there is doubtless present some peculiar and characteristic condition of the mucous membrane lining the intestinal tube, as exhibited by the increased secretion from its exhalant vessels, and the consequent or symptomatic increase of peristaltic action of the muscular tunic of the same tube.

Diarrhœa, then, may be defined to consist in morbid frequency, fluidity and vehemence of the alvine evacuations. These circumstances are usually connected with pain and griping preceding each motion, and more or less relieved by it. For the most part, there is loss of appetite and gastric uneasiness, amounting occasionally to nausea and vomiting. The tongue is furred and whitish: the pulse small and rather frequent, but free from febrile irritation; there is early loss of strength, and when the discharges are abundant, or the attack is protracted, emaciation goes on to a striking degree.

Nosologists have made a variety of distinctions in diarrhœa, founded upon the causes by which it is brought on, and upon the nature of the fluids voided; thus we have mucous, serous, lienteric, bilious, and gypseous diarrhœas. These phrases explain themselves with two exceptions. Lientery is an old word, referring to that looseness of the bowels connected with almost total defect of digestion of the food taken, which passes unchanged, or nearly so, though mixed with fluid. Gypseous diarrhœa is a phrase of Good, who takes for granted the calcareous nature of the white or chalky discharges sometimes passed. This assumption is, as far as we know, unfounded, for no chemical proof is offered, that a secretion so improbable and unnatural has taken place from the intestinal vessels; and the color may be owing to defect of bile, or the presence of much albumen. The same writer speaks also of a variety which he denominates *tubular* diarrhœa—membranous flakes, of different shape and size, coming away, some of them moulded upon the inner surface of the alimentary tube. This is a rare phenomenon. I have never met with it, unless following or connected with a high degree of inflammation of the membrane, as in enteritis proper and in dysentery. I cannot regard it either as correctly considered, a form of diarrhœa, or even as one of the symptoms of that affection. It is of diphtheritic character and origin.

The *causes* of diarrhœa are numerous and diversified. In a general way, we may affirm, that it is likely to follow the entrance into the bowels of anything which has bid defiance to the solvent and assimilating powers of the gastric fluids. Thus, the husks and seeds of fruits rarely fail to promote the alvine evacuations, and are used, figs for example, and unbruised mustard seed, as laxatives, by many invalids. Undigested food, under whatever circumstances, whether the failure be owing to weakness of the stomach, permanent or temporary, if not got rid of by vomiting, is apt to excite diarrhœa, and thus promote its own expulsion. Not only the husks and seeds, but the juices of many fruits, and the substance of many vegetables, are irritating and laxative to those unaccustomed to their use as diet. Indian corn, cabbage, the sweet potato, the beet, apples, pears and berries, may be enumerated as showing this quality. The waters of many sections of country are purgative to strangers. I need not do more than allude to the long catalogue of cathartics to be found in treatises of Materia Medica.

It usually occurs that diarrhœa, excited by these modes of irritation, terminates promptly; the morbid causes having procured their own expulsion, by the peristaltic action which they have excited, the disturbance and ailment gradually subside, health being at once restored. On the principles of revulsive derivation, with which all are familiar, and which are readily applied here, many slight indispositions of which the patient had complained previously, are found to be thus relieved, and he enjoys better health than he did before the attack. Hence diarrhœa in its milder form, has come to be regarded as a salutary sort of malady, and its spontaneous appearance often looked upon as critical. It was easy, and not irrational, to reason a little farther, and infer that its artificial production by cathartics, was likely to prove beneficial in disease generally, and thus the extensive employment of this class of medicines is accounted for. Hence, also, the resort to cathartics, as preventive of certain ailments, and the habitual use of "spring physic" among other domestic prescriptions.

There are other causes of diarrhœa besides those which directly affect the alimentary tube. The ready reciprocity of action or impression which connects the cutaneous surface and the abdominal viscera, is a matter of familiar attention, and we are here presented with a striking example in illustration of it. The skin, when in a moist and perspirable state, being exposed to the influence of a damp or cold atmosphere, its vessels undergo a severe constriction, the fluid that filled them being expelled; the cutaneous transpiration is obstructed or checked, and often obviously vitiated in quality, and determination of blood necessarily takes place to the internal organs and surfaces. Particular predispositions, original and accidental, permanent and temporary, decide the current of these internal determinations. If the bowels receive the full shock of the morbid impression, we may have either enteritis or diarrhœa, or dysentery, or colic, according to the various modes of morbid action which may be excited. The irritation affecting the mucous surface expends itself sometimes on the secretory vessels, and there is an inordinate effusion of somewhat vitiated mucus, perhaps mingled with serum; this excites by its presence and distension, the peristaltic movement of the muscular structure of the tube and is expelled. The discharge is often so acrid as to occasion a burning pain with tormina, as it passes along the alimentary canal, and give rise to annoying tenesmus. Nay, as the upper lip is inflamed by the coryza of catarrh, so the anus and neighboring surface may be inflamed by this discharge. From a supposed analogy referring to the similarity of cause, of surface affected, and of effused fluid, some have entitled this catarrhal or rheumatic diarrhœa.

Morbid impressions, made upon the liver, whether mediately or immediately, sometimes occasion a large secretion of vitiated bile, which, either by its inordinate amount or some change in its qualities, becomes a source of irritation to the intestines, and produces what is not improperly distinguished by many writers as a bilious diarrhœa. This variety of the disease, it is evident, may occur under a great diversity of circumstances, and show itself during the existence of many maladies, sometimes adding to the danger, and sometimes regarded as critical and salutary. Sympathetic or symptomatic diarrhœa is of frequent occurrence, whether from extension or metastatic transference of morbid irritation. We meet with it as the result of repelled eruptions at the subsidence of the exanthemata, as when measles are drying away upon the skin; in irregular gout and occasionally in rheumatism. It supervenes also pretty regularly during the last stages of certain diseases, as in phthisis pulmonalis, and constitutes, so to speak, the "initiatory stage" of others, as in epidemic or malignant cholera, and sometimes of dysentery.

Prognosis.—Diarrhœa, I have said, exhibits in a very great majority of cases, a disposition to spontaneous subsidence, either from the expulsion by alvine discharges of the crude and irritating matters which have given rise to it, or from the relief, to the disordered vessels of the mucous surface, by the effusions which they pour forth. This relief, however, does not always attend; the irritating cause is not always got rid of in this summary manner, but sometimes originates a degree of irritation which progresses from one step to another, until inflammation being lighted up, we have dysentery, on the one hand; or, on the other, a tenacious habit of morbid action is acquired, and the disease runs into a chronic form. This is a singularly obstinate and unmanageable affection, bidding defiance to our best remedies, and enduring through an indefinite protraction, from a few weeks or months to several years. Under these circumstances, the condition of the patient is truly to be pitied, all capacity of comfort or enjoyment being totally destroyed, and a gradual and prolonged atrophy and exhaustion leading him downwards to a lingering death.

In some localities and under certain contingencies it promptly assumes this serious character. Our troops in Mexico were wretchedly harassed by it; and the obscure but largely fatal development of it some years since at the National Hotel, in Washington, will long be remembered.

Treatment.—In general, perhaps, it might suffice to put the patient in a recumbent posture, and at rest; for muscular motion and an erect attitude favor, as all nurses know, the disposition to inordinate frequency of alvine discharges; and to inculcate abstinence from every thing but fluids adapted to quench thirst, if it be present, and even these should be taken in very moderate amount. A mild anodyne diaphoretic will seldom fail to remove at once every unpleasant symptom; a small dose of the elix. paregoric or tinct. camphor is often used.

Few rules in practice have been more generally received than that which advises the exhibition of some gentle cathartic in incipient diarrhœa; and this homœopathic maxim is applied in all instances, from whatever cause arising, and with whatever symptoms attended.

The object avowed is here twofold; the purgative is supposed, on the one hand, to carry off all crude or feculent matters which may be present within the canal and acting on any part of its surface, as a source of irritation; and, on the other, by soliciting a free effusion from the excited secretories, to diminish the irritation present, whether primary or sympathetic. Now, although I will not deny the propriety and efficacy of the cathartic in particular instances, yet I cannot reconcile myself to its general or promiscuous administration. A distinction, may, for the most part, be drawn without difficulty, between those cases in which it is indicated, and those in which it is not admissible. When indigestible or improper articles of food have been taken, and there is reason to believe they have not been expelled, but remain within the digestive tube, I would not withhold a mild laxative. So, also, if on inspection of the evacuations, they were found to contain no feculent matter from the first, or to present no trace of bile naturally mingled with them, being white or clay colored, I would prescribe a cathartic. Some care is necessary in the selection of a proper article or formula. The drastics should be avoided, and the least irritating laxatives employed. Rhubarb has been long considered entitled to a preference. I usually select, when the stomach can bear it, castor oil, which operates at once mildly and freely. If it be offensive, I combine rhubarb either with the sal. Epsom, adding a little aromatic, or with calomel. This latter combination is especially adapted to cases in which the liver is torpid and the stools clay colored, from defect of the hepatic secretion. A few grains of the mercurial, with a proper dose of opium, gives quickest relief under the opposite condition of that large and important gland, when it is pouring out an inordinate amount of its secretion, or gives it forth vitiated in any manner in its qualities.

Experience has long since proved the value of the aromatics, in attacks of diarrhœa. Mint, aniseed, ginger, etc., may be employed in mucilaginous solutions; with the addition of a slight opiate, they relieve the gripings which attend, and frequently put an end to all complaints. These remedies having been prescribed during the day, if bedtime should arrive and find the patient still annoyed with his looseness, let him take a full dose of Dover's powder, ten, twelve, or fifteen grains, applying for an hour or two, warm flannels wrung out of brandy and laudanum, or a warm mustard poultice to his abdomen. A hot pediluvium will be a useful adjuvant, especially if the skin be harsh and dry, or the temperature of the surface unequal. The warm or hot bath, if convenient, may be resorted to with great advantage. I employ occasionally, in cases which seem disposed to protract themselves, the Dover's powder combined with a small amount of rhubarb, at proper intervals throughout the day. Under the use of this formula the stools will assume a degree of consistence, and be passed in diminished number without pain or inconvenience.

Many practitioners are in the habit of commencing the treatment of diarrhœa with an emetic, which they occasionally repeat if necessary; they assert that the morbid train of associated actions, in which the disease consists, being thus early broken in upon, health is at once or very readily restored. I have no objection to this method, but that it is, in relation to the majority of cases, unnecessarily harsh, and that the exercise of a little forbearance, or the employment of the gentle remedies above pointed out, will answer every purpose. The emetic is indicated, if from the commencement of the attack the tongue is thickly furred, with gastric oppression and anxiety, and ineffectual attempts to vomit. Ipecacuanha should, I think, be selected, as least irritating, and yet thoroughly effectual in its operation. The emetic may be prescribed at any period, during a protracted and obstinate case, for the purpose of exciting new and revulsive action, by the sudden impression or shock which it gives to the system. Some more active and harsher article must be here added to or substituted for the ipecac., as the tart. antimony, sulph. cupri, or sulph. zinci. This last is highly recommended by Mosely, whose well known *solution* will be frequently found useful.

In all cases of prolonged diarrhœa, the use of absorbents and astringents will be absolutely demanded. The prepared chalk may be mingled with our mucilaginous solutions, and made the bases of our formulæ. To this may be added the tinct. kino, in sufficient quantity. An extensive experience enables me to confirm all that its eulogists have said, in praise of this valuable article. Pemberton in England and Bally in France, have written much concerning it. The former believed it to be possessed of some specific virtues, and thought it an astringent, only when diarrhœa is present, not universally. He prescribed it in substance and combined it with opiates. Bally has given us, in detail, the result of numerous experiments made with it, at La Pitiè, in Paris. In recent cases, it almost invariably effected a cure promptly. In chronic diarrhœas it seems to have been equally beneficial, whether they were or were not attended with febrile and inflammatory symptoms. He succeeded with it in one case, of not less than three years' standing. It consists almost entirely of gallic acid or tannin, with some flavoring and coloring matter. The colorless preparation of the shops—the pure tannin—is a very efficient and available formula, in doses of from 3 to 5 grains and upwards. Other astringents have also their advocates. Catechu, the rind of pomegranate, the decoction of blackberry root, logwood and galls, are among vegetables the most trusted to. It is well to be aware that a change from one to another of these, is useful in obstinate cases, the first losing its influence by habit. Alum is highly commended, among others, by Cullen; some prefer to administer it in substance, combining it with nutmeg or any other aromatic; but in general the whey is preferred. The acetate of lead is a very favorite prescription with me. Combined with opium it will scarcely ever fail in any ordinary case, and even when we have to contend with the most tenacious protraction of the disease, it is our best resort. The doses may be increased from one to five grains, adding opium pro re nata. The sulph. cupri is highly recommended by Elliotson and some other British practitioners. They combine it often with opium, and regard it as best adapted to cases of long standing. I have not often seen it beneficial. The nitrate of silver is more serviceable in my hands; it is indicated and will do good service, when there is deep fiery redness of the lining membrane of the mouth, tongue and fauces, or aphthous ulceration of the mucous surface. In the meanwhile, we shall derive much advantage from the exhibition of our astringents as enemata. Opium, and the acet. plumbi are here best adapted, and are best given in small quantities of any mucilaginous solution gently thrown up into the rectum.

On the principle of revulsive determination by counter irritation, some apply blisters to the abdomen in troublesome cases, others to the extremities, the wrists and ankles. With similar views, perhaps, or it may be merely as a powerful alterative, a few of our American physicians, as well northern as southern, have strongly urged a resort to the mercerial treatment, carried to the extent of a moderate salivation. I have not, in any instance, perceived from it the beneficial effects which they have promised us, but, on the contrary, have found it productive of a great degree of suffering and inconvenience, which was not compensated for. I do not now speak of its exhibition in those examples of diarrhœa which are complicated with or depend upon visceral obstruction and derangement; in these it may be indicated, and may prove indirectly advantageous.

The mineral acids have also been proposed here, partly as alteratives, and partly as astringents, and, as is affirmed, have been occasionally of great service. The nitric, sulphuric, and muriatic are used. I have, now and then, seen a patient derive some benefit from the sulphuric; the vitriolic elixir, a combination with some aromatic, being the formula generally chosen. I have thought it succeeded best when administered with a light tonic, as cinchona or quassia. It may be given freely, and is found so widely useful that an opinion is gaining ground that it is possessed of a peculiar and specific agency.

In *chronic diarrhœa*, the general management of the patient is of great importance. His diet should be light, but nourishing, and even gently stimulating, consisting, when the stomach will bear it, of solid food, such as biscuit, toast, soft boiled eggs, poultry, and tender beefsteak. If he cannot take these, give him broth pretty well seasoned, jellies, sago, arrowroot or rice gruel, rendered cordial by spices. Nothing acescent should be allowed him; fruit, and crude vegetables must be altogether forbidden. His drinks should be in small amount, no more fluid being taken at any time than is absolutely necessary to quench thirst, all superfluous fluid being laxative. A little sound Madeira or Sherry may be permitted, or, perhaps, in preference, port wine.

Great advantage has attended the use of the flannel compress on the abdomen, and the roller, as advised by Dewar.

The patient should guard himself carefully against all vicissitudes of weather, and avoid every exposure to cold and moisture. Let him exercise much in the open air, if he is able; let him leave his home and go through a long journey, on horseback, should his strength permit, seeking a warm and dry climate; finally, if all these means fail to restore him, send him on a long sea voyage. However we may explain the fact, no one doubts that the general effect of confinement on board ship is, in a healthy man, to render the bowels costive; so in diarrhœa, become habitual, the very first access of sea sickness is often perfectly effectual in putting an end to the diseased propensity, and restoring tranquillity, or even inducing torpor of the bowels.

DYSENTERY.

Although, at the present day, the seat and nature of this painful malady are well known and understood, yet there has been much dispute among pathological writers of past times concerning its proper classification. Akenside, Richter, Scott, and Parr, no inferior names among our moderns, agree with Cœlius Aurelianus, and other ancient authors, in regarding it as a rheumatic affection of the intestines. Sydenham viewed it as "a fever," to use his own strange, but significant phrase, "*turned in*" upon the bowels. Cullen, also, admits it among fevers, but adds contagiousness as an essential characteristic. Linnæus and his followers ascribe it to the irritation of a specific animalcule, the acarus dysenteriæ. Sir G. Ballingal treats of it as mere colitis. Chapman and Caldwell, of our our country, look upon it as primarily a gastric affection, while James Johnson attributes it to cutaneous and hepatic derangement and disorder. Sydenham, notwithstanding his pithy definition given above, describes two forms of dysentery; the first, simple dysentery, without fever; the second, of a more violent nature, with fever; and this distinction is received by Good, and incorporated into his system. Eberle differs little from Ballingal, except that he considers it a more diffused inflammation of the intestines.

We must take care not to confound dysentery, on the one hand, with diarrhœa, or on the other with enteritis. It is true, as I have already stated, that diarrhœa is the initiatory state of many dysenteries; but some attacks come on without any previous diarrhœa, and diarrhœa may and does exist without inflammation of the intestines; nay, according to my views, it ceases to be diarrhœa proper when this has supervened. It is, therefore, true that inflammation of the mucous coat of the bowels is an essential element of dysentery; but there are other elements equally essential, without which, it would not be dysentery, but mere enteritis, a confusion which no physician is likely to make at the bedside.

The violent peristaltic movements of the bowels, irregular and spasmodic, the peculiar and foul discharges of mucous, sanguinolent and purulent matter; the shifting pains and urgent tenesmus; these are as uniform parts of the history of dysentery, as the inflammation, and they surely do not belong to the description of enteritis. Like enteritis, dysentery is essentially pyrectic also; but the constitutional derangement differs exceedingly in the two cases. Writers dwell upon the small, oppressed, sinking pulse of intestinal inflammation, so usually connected with true gastritis. "Animal life is hurt and lessened," says Hunter. In dysentery, on the other hand, the pulse is full and bounding, and the general excitement, for the most part, is of open character and high grade.

Sydenham, Good, and such others as treat of dysentery simple, and without fever, have committed an error, according to my views, in mistaking for it an unmanageable form of diarrhœa. The nature of the morbid alvine discharges, and the great variety of appearances presented by the evacuations, have led them astray, and occasioned the confusion among authors, who assert that it is a matter of difficulty to distinguish between diarrhœa and dysentery. In practice, it is true that we shall meet with cases of a transitive character, partaking of the symptoms of both, and, it may be, that we shall doubt for a short period, as to the proper designation of such cases; but our doubtful or erroneous nomenclature will by no means lead us to error in the treatment, or, perhaps, even in the general diagnosis. When the symptoms are thus mingled, there must, in all likelihood, be some complication in the nature of the attack, requiring a corresponding modification in our plan of management. Theoretically, the diagnosis is easy. Diarrhœa consists in morbid secretion and vehement peristaltic action, the results of *irritation* of the mucous digestive surface. Dysentery implies *inflammation*, with its consequences, ulceration, hemorrhage, and morbid secretion, with spasmodic action; an interruption of peristaltic movement by constriction of, or in some part of the intestinal tube, being a frequent attendant.

Symptoms.—Dysentery is a painful affection of the bowels, with fever; there is a feeling of soreness in the abdomen, with occasional griping and tenesmus; there is strong propensity to stool, recurring at short intervals, the dejections being mucous and bloody; feculent matter is discharged seldom and in small quantities; sometimes not at all.

The attack sometimes commences with a chill; at others, the pains in the abdomen precede; not unfrequently there is no rigor, but after an uncertain period, the skin becomes hot and dry; the pulse is hard, frequent, full and tense; the tongue is covered with a thick yellowish or whitish fur; there is thirst, with restlessness and jactitation; dejection of spirits and loss of strength, and great anxiety and distress about the præcordia. As the disease progresses, the alvine discharges become very frequent and offensive; tormina and tenesmus, unrelieved by the evacuations, which consist as above described, of a thick mucus, resembling jelly colored with blood, or in the latter stages, of a watery serous fluid highly fetid, resembling the washings of putrid flesh; pure blood is sometimes passed in considerable quantity. Small round lumps, sometimes consisting of hardened fecal matter, and sometimes of fatty and of fibrinous substances, which have obtained the technical name of scybala, are occasionally voided, and generally to the relief of the patient.

The intestinal pains are, in many cases, intolerably severe, inducing great debility of body and light delirium; the stomach sometimes becomes very irritable. Mortification occasionally ensues, the pain ceasing suddenly, offensive stools flowing, almost without interval, from the anus, unnoticed by the sick; and death soon relieves the sufferer from his torments, and the attendants from an object now loathsome to look upon.

Such is the usual course of the symptoms, but the various cases met with, present, from time to time, many irregularities. Thus I have seen fatal dysentery, with very little abdominal pain, the patient seeming to sink merely under the debilitating effect of the large and frequent discharges of blood and mucus.

Necroscopy.—Autopsic examination uniformly reveals to us all the appearances of high inflammation of the intestinal mucous surface, chiefly of the colon and rectum; patches of this tissue are deeply injected, infiltrated with blood and softened; and if the case have been of any duration, ulcers are formed of various size and shape, extensively diffused. The canal is sometimes found constricted. Gangrene and sphacelus, separating considerable lengths of the tube, are known to have taken place.

Causes.—Dysentery occurs sporadically, and as an epidemic; in the latter form, its ravages have at times been dreadful indeed. Of late years it has been the most frequent and extensive of all the epidemics of our own country, extending summer after summer from Maine to Texas, and from the great lakes to the Atlantic coast. Cullen, as I have remarked, asserts it to be uniformly and essentially contagious, and the doctrine has received very able and extensive support from others. And even among those who refuse to consider dysentery as in itself, uniformly or essentially contagious, there are few who doubt that it may assume this character or quality, under particular circumstances —as in camps, jails, hospitals and other crowded and ill-ventilated places, and when the attendant fever takes the typhoid type.

In warm climates, dysentery belongs to the list of autumnal maladies, and is produced by all the agents which give rise to bilious attacks, as the phrase is—cholera, bilious remittent, intermittent and colic; malaria, for example, exposure to sudden and unexpected alternations of temperature, to cold and moisture; the chilliness of a dewy night after a hot day; wet clothing, damp beds, sleeping on wet grounds, as when troops bivouac in the fields. It develops itself, occasionally, in combination with our malarial fevers, both remittent and intermittent, adding very much to the suffering and danger of the patient. The most malignant and rapidly fatal case of *country fever*, which has ever fallen under my care, was of this nature.

A strong predisposition to dysentery is generated by continued fatigue; by long use of bad and innutritious diet; by confinement to bad air, whether vitiated by putrid animal or vegetable effluvia. Under the influence of these causes, arise those dysenteries which prevail with fatal sway in particular localities, as in ships and prisons, depopulate whole communities and drive armies from the field.

Malaria is now universally regarded as one of the causes of dysentery. In all hot climates, it originates so evidently from the same contingencies that produce the endemic fevers, connected with hepatic derangement, as to have received from writers on the subject, titles expressive of this obvious connection; as bilious fever with flux, hepatic flux, etc.

Dysenteric evacuations are, as I have said, exceedingly diversified in their appearance. Mortification has frequently been inferred, but too rashly, from the peculiar fetor and offensiveness of the sanious and ichorous fluids poured out; and the membranous films thrown off are assumed to consist of sloughing portions of the villous coat of the intestines. But recoveries happen after both these phenomena have been noticed, and so readily and perfectly, as to be altogether inconsistent with the presence of gangrene of the alimentary tube. The films, I suppose to be similar to the membranous or fibrinous deposits met with in trachitis and in the tubular diarrhœa of Good.

It is not easy to understand how the sebaceous lumps found in dysenteric stools are generated. Sir Edward Home has endeavored, it is true, to prove that it is among the ordinary functions of the intestines to secrete fat; but here the healthy functions and secretions are all interrupted and obstructed. The presence of such scybala is not, by any means, so uniform or frequent a circumstance as one would infer from a perusal of the books on the subject. In a considerable majority of the cases which have come under my care, they have not been observed, though it is my constant habit to inspect the alvine discharges, and to enforce the same attention upon the nurses employed. We meet oftener with hardened lumps of the fecal matter which have been unaccountably retained. Their expulsion seems always to give relief. Ulceration and erosion of the intestinal tunics, may occasion hemorrhage, from the lesion of some large vessel. Mosely affirms pure arterial blood to have been voided, in a stream, at brief intervals, from such lesions, and the patients to have thus bled to death. I have myself seen, more than once, considerable venous hemorrhage. The ordinary mixture of blood with mucus, seems to be the result of the yielding of the vessels upon the villous surface, to the intense inflammatory congestion, by diapedesis or transudation, without ulceration, in the first instance, or breach of continuity by rupture. In one fatal case, in which I took great interest, fallacious hopes were frequently aroused by the alternation of bright yellow fluid and feculent stools, interposed among the foulest sanious and muco-sanguinolent evacuations.

Prognosis.—The prognosis in dysentery is in the greater number of instances readily drawn, depending, for the most part, upon obvious conditions evidenced by unequivocal symptoms.

In the sporadic cases which so frequently occur in all seasons, and in every climate, from the application of transient causes, such as exposure to cold and moisture, and the use of articles of food of indigestible and irritating character, the prognosis is generally favorable. Allowance, however, must be made for the constitutional peculiarities of the patient, who is likely to suffer much, and run not a little risk, if subject to frequent attacks of diarrhœa, or other bowel complaints.

Epidemic dysentery may be pronounced to be always a serious and dangerous malady, and in low, damp situations is fatal in pretty large proportion. The autumnal epidemic dysenteries of hot climates are always dreaded, and with just cause.

The greatest amount of mortality, however, is met with in the typhous form, which is apt to be generated in crowded and ill-ventilated places, as in jails and prison-ships, and spreads itself in camps, where the sick are of necessity deprived of the proper solace and comfort of good shelter and careful nursing. Yet this fatal variety may present itself under very opposite circumstances.

Among the most important of the symptoms to which we look as affording us a test of the true state and probable prospects of our patient, I am inclined to regard the degree of tenesmus present, and the frequency of the calls to stool. From the latter, indeed, we draw our least fallacious conclusions. Tenesmus, when peculiarly urgent, and it is sometimes ceaseless and intolerable, gives a similarly unfavorable impression as to the condition of the bowels. The occurrence of aphthæ in the mouth, or a deep redness, with smooth and dry state of the lining membrane of the cheek, and gums, and the tongue, offer a gloomy presage. Hiccup, a low delirium, and a relaxed state of the sphincter ani, are for the most part immediate precursors of a fatal issue.

On the other hand, we infer a favorable change in the prospects of our patient, when we observe a diminution in the degree of tenesmus, and the urgency and frequency of the returns of the propensity to stool, the intervals being attended with more notable relief of the abdominal uneasiness, the bowels becoming less tender on pressure, the lining membrane of the mouth and tongue less red and moister, with a more natural coating of the latter, the evacuations improving in appearance by assuming the feculent aspect and odor, the surface of the body becoming of a more regular and uniform temperature, with general perspiration and refreshing slumbers.

Treatment.—The indications which are to guide us in the treatment of ordinary dysentery, whether sporadic or epidemic, are clear and undisputed. Our object is, primarily, to effect as promptly as possible the removal of spasm, and the reduction of inflammation, two parts of the description of this disease, which I have maintained to be uniformly and essentially characteristic. As besides this inflammation and spasmodic state of irritation, we have also, almost constantly, a species of entonic hemorrhage from the intestines, there cannot be a reasonable doubt of the occasional propriety of venesection.

But although I believe there is no case in which the remedy is more distinctly called for, and in which, when judiciously employed, it will do more obvious service, I must protest against the general and copious bloodletting sometimes extolled. Some obvious distinction may be noted. Sporadic and vernal dysenteries bear venesection infinitely better than the epidemic and autumnal forms. When of typhous character, and spreading by contagion, the lancet is most clearly contraindicated, and can no nothing but injury.

If we determine in favor of the propriety of venesection, we must open a large vein, nor check the flow of blood until it has produced some sensible effect upon the patient, removing the pain in the abdomen, and reducing the vascular excitement. In autumnal attacks, at least, we shall seldom enjoy opportunity for a repetition of the remedy. The influence of our hot season on the body, is such as to predispose the system to sink with readiness under all modes of active depletion, and we shall often find the strength decline with great and frightful rapidity.

A great deal of stress is laid, by some modern writers, upon the means of topical bloodletting, and they are, no doubt, very often of great benefit; besides that, they are attended with little risk of any coincident injury. A large number of leeches may be laid to the abdomen, or, if these are not at hand, cups should be applied pretty extensively over the surface. The flow of blood from the leech-bites and scarifications should be promoted by the employment of warm stupes, which also tend very much to soothe and comfort the patient, and may, therefore, be persevered in throughout the whole duration of the case. I have often had occasion to see very great relief to the tormina and tenesmus given by the application of these warm fomentations and poultices, which may, after awhile, be rendered somewhat stimulating by the addition of mustard or of hot spirits.

Emetics have been esteemed, from the earliest times, among our most valuable remedies in dysentery, and many physicians advise their early administration in the incipient stages of the attack, and repeated resort to them throughout its whole progress. Wherever there is present any considerable degree of gastric oppression, with nausea or retching, and a foul tongue, or the patient has been living on a bad diet, or has eaten anything acrid or indigestible, which has not been evacuated, it may be proper to unload the stomach of such irritating crudities. This, however, is, so far as I have seen, all that we can gain from the exhibition of emetics; the patient is rendered less uneasy, but no strong impression is made upon his tormenting disease.

Purgatives, either alone or in combination, are employed by a very large majority of practitioners without scruple; but all acknowledge the necessity of making among them a judicious selection, and the risk of doing grave injury, by inattention or unskilfulness in this matter. The purpose to be aimed at, is the free and complete evacuation of the annoying ingesta (if there be any), and the foul secretions of the alimentary tube, by means that shall not add to, but diminish, as far as possible, the inflammatory and spasmodic irritation present, and productive of painful and often obstinate constriction, which, to overcome, has been considered as of great importance. To accomplish these purposes, a great diversity of medicines and formulæ are proposed. Calomel alone, is prescribed by one; another conjoins it with opium, as an antispasmodic and anodyne; a third objects to this union, and prefers to substitute hyoscyamus, as free from astringency, and therefore more likely to remove constipation. Antimonials are highly extolled by Cullen, who advises them to be given in small doses, and at such intervals, as to determine their operation by stool, and not by vomiting. With this view, both Dr. Young and Sir John Pringle have given the weight of their powerful sanction to the exhibition of the vit. cerat. ant. Rhubarb, so unhesitatingly condemned by Cullen, has nevertheless its advocates, and is very frequently used, though chiefly in combination. Cleghorn, whose opinions are always entitled to respect, speaks, without reserve, of ipecac., as useful both by its emetic and purgative effects. Playfair administered it in much larger doses than we are accustomed to employ, and, as he informs us, with very great success. He gave the dose of ʒss to ʒj, adding from thirty to sixty drops of tinct. opii, keeping the patient for some time at rest in a horizontal posture. He tells us, that though the first portion was sometimes rejected, the second was almost invariably retained, and proved gently and beneficially cathartic. Clark exhibits the same article in the form of enema, and bestows a warm encomium upon its virtues as displayed in this mode of administration. He orders ʒiij of the bruised root to be boiled in a quart of water down to a pint, which injection may be repeated twice or thrice in twenty-four hours. In both these last formulæ, ipecac. is singularly effectual, we are told, in relieving spasm, and procuring free and feculent stools. To this beneficial operation of ipecacuanha in dysentery, I can indeed bear, from my own experience, the most decided testimony. I combine it with ol. ricini, and can safely aver, that I know no purgative formula gifted with equal efficacy in the case before us. In the proportion of a grain or two grains of the powder mingled with one or two table-spoonfuls of castor oil, it will rarely fail to relieve the intolerable tormina and tenesmus, and obtain, what is so much desired, a free evacuation of feculent matter, bringing away from the bowels masses of scybala, and other contents, that have the appearance of having been long retained, to the great solace and comfort of the patient.

It has not been unusual to prefer to all others, the mercurial purgative, in the early stages of dysentery, and many practitioners have continued to prescribe it, at intervals, throughout the whole course of the attack, either alone or in combination with opium, with a view to its cathartic operation and its ultimate alterative influence. It is a matter of much consequence, however, to prescribe it in the proper and effective dose. If offered in too small amount, it will often disappoint us by its inertness, or do harm by giving rise to some irritation or uneasiness of the stomach or bowels. We must administer it largely and freely, so as to produce a prompt and forcible impression upon the system. For this purpose, scruple doses are recommended by Johnson and Cunningham, who speak of this as the maximum, and caution us against any further augmentation, as likely, in some manner, to prove a source of injury. It is affirmed that calomel administered in this free and bold manner, will, in the worst forms of dysentery, almost at once alleviate the sufferings of the patient, and arrest the progress of the distemper, diminishing the tormina and the tenesmus, and lessening the propensity to go to stool; that within a short interval, that is, from twenty-four to seventy hours, it will bring on ptyalism, and that with the occurrence of sore mouth, there will coincide a striking and permanent subsidence of all the bad symptoms, in fact, a removal of the disease.

The employment of opium in some form of preparation and combination, for the relief of the torments of this harassing disorder, is almost universal; but I am disposed to regard it as of higher value than a mere palliative. I have, perhaps, expressed too strongly the sentiment of its general reception in practice; some physicians have gone so far, on the opposite side of the question, as to denounce it. Cullen, for example, affirms opiates to be worse than useless, "by occasioning an interruption of the action of the small guts, and thus favoring the constriction of the colon," neither the fact nor the speculative explanation being consistent with the real condition of things.

It is true that opium may be useless, or even injurious, if administered before any effort has been made to diminish the general febrile and local inflammatory excitement by venesection, etc. Premising these necessary measures, however, or combining an opiate with a well selected cathartic, as calomel or castor oil, we shall derive from it unequalled advantage and comfort. No less beneficial is its action as a diaphoretic, and to give it this effect, we unite it with ipecacuanha, an article already noticed with due commendation. The Dover's powder may be prescribed in moderate quantity, at intervals through the day, and at night in as large a dose as the stomach will bear. If the ipecac. disagrees in this way, we may offer it in the form of pill, increasing the proportion of opium pro re nata. This medicine does not seem to me to interfere with, but rather, indeed, to promote the good effect of whatever other medicines we are pursuing. A combination of Dover's powder with the supertartrate of potass has been found very useful, in the proportion of 5 to 10 grains of the former, and of the latter ʒss to ℈ij.

I would gladly impress upon the profession universally, the unhesitating conviction which I feel, and upon which I never fail to act, that it is our professional duty *always to relieve pain* and suffering, when it is in our power, and that, in all diseases in which pain is one of the elements or uniform conditions, its relief or palliation is so far curative. Pain enhances irritation, and urges it on to its worst results, excites spasm, aggravates inflammation, deprives the patient of slumber or repose, and thus, by its direct and indirect influences, prostrates his strength, and exhausts his vital powers. Opium, if its exhibition be properly timed, will never fail to subtract from the intensity of pain, if it does not subdue it altogether; it relaxes the harsh surface into a soft, warm perspiration, and procures the inestimable blessing of refreshing sleep—a respite to the worn-out sufferer, how unspeakably grateful, how restorative! The doses employed must be large and free, in proportion to the suffering and danger of the patient. We may give from three to five grains at once, in solution, and repeat them at short intervals, until relief be procured, or symptoms of narcotism supervene. It has, indeed, been carried much farther than this. Fahnestock prescribed from 3 to 15 grains at a dose, and Christison has administered 24 to 30 grains in the twenty-four hours.

Of the diaphoretic plan of treatment, so vehemently extolled by those who, with Richter, have advocated the rheumatic or catarrhal pathology of dysentery, I would say, that while it offers us many valuable auxiliaries, it does not deserve to be confided in exclusively. It is true that the relaxation of cutaneous constriction, and the return of natural softness and moisture of the surface, are among the most favorable symptoms; yet these tokens of recovery are found, not only in dysentery, but in all other inflammatory affections of internal viscera, to follow much more readily, and with far greater certainty, the judicious employment of the general antiphlogistic regimen, including venesection, and the gentle cathartics above enumerated, than the exhibition of the mere diaphoretics. In fact, I am not inclined to repose any special confidence in remedies chiefly adapted to procure sweating, unless, as in the instances of opium and ipecacuanha, and, perhaps, the antimonials, there be also conjoined with this sudorific property an antispasmodic, purgative, or anodyne effect.

It ought to be noticed, too, that it is in the dysenteries of winter and spring, rather than those of the summer and autumnal seasons, that we shall be able most clearly to trace the immediate benefits of the diaphoretics. Here we shall derive great advantage from the use of the warm bath, and after the patient has been put to bed, the assiduous application of warm fomentations to the abdomen. Under these circumstances, many advise the exhibition of camphor as an aromatic and sudorific. I would not trust to it alone, but have seen good effects follow its combination with opium, ipecac., and calomel.

The hemorrhagic character of the dysenteric discharges, does not, for the most part, deserve or require any special notice. Sometimes, however, the flow of blood is so profuse as to threaten speedy and permanent loss of strength, if not checked. This may be owing to ulceration and erosion of some vessel or vessels of notable size. Various astringents are employed to restrain such hemorrhage; kino, catechu, pomegranate rind, among vegetable articles, are to be preferred. Kino, especially as combined in the cretaceous julep, is well adapted to instances in which the evacuations are composed chiefly of serous and mucous secretions, mingled as they often are with bloody transudations, and thus highly colored; but in the true hemorrhages, of which I am now speaking, I am not willing to trust to any astringent less impressive than the acetate of lead. This may be prescribed alone, but is generally and advantageously combined with opium and ipecac. Its dose must be proportioned to the urgency of the case; from one grain to five, every two or three hours, will usually answer every purpose.

In the earlier stages of dysentery, the annoyance and suffering to which the patient is subjected are plausibly attributed, at least in part, to the presence of feculent and acrid matters in the intestinal tube; but surely, after free evacuations from the bowels have been procured, we are to regard the morbid and acrimonious excretions as the consequences, rather than the causes, of diseased action. Hence, though it is incumbent on us to provide for the expulsion of such irritating accumulations, yet it is a far more important object to correct that unnatural condition of the affected tissue upon which depends their formation. Now, I am well satisfied that the acetate of lead has no feeble tendency to influence, in this beneficial way, these mucous surfaces, diminishing inflammatory irritation, constringing the distended vessels, and correcting the vitiated character of the secretions effused. I am in the habit of prescribing it whenever these are poured out in inordinate quantity, without regard to their nature and composition, and whenever the degree of pain and distress is particularly severe.

In the relief of these symptoms, much aid may be procured from the judicious use of the proper enemata. In the very first stages of the attack, tepid water, thrown up alone, or mingled with some oil or mucilage, promotes the full and easy evacuation of the contents of the lower intestines. When this has been accomplished, a proper amount of opium may be added to the mucilaginous fluids employed, and will be found effectual in relieving the tormina and tenesmus complained of. Cold water alone is, in this second stage, a very grateful and soothing application, and often very eagerly desired by patients; when they are thus too frequently indulged, however, I have suspected it of inducing a degree of debility in the sphincter ani, which renders them incapable of retaining the alvine discharges, and occasions some inconvenience, if not more serious evil. The acetate of lead has been found useful here, in restraining both the frequency and abundance of the discharges, and quieting the annoying irritation of tenesmus. This is a symptom so grievously complained of by the sick, that physicians have everywhere, with praiseworthy zeal and benevolence, busied themselves in efforts for its removal. We must remember that it is prominently a sympathetic, not a local affection, and refuses to yield to any local remedies, subsiding when the internal mucous inflammation and vehement peristaltic excitement upon which it depends are subdued, and not until then. It is very liable to be increased by the very measures suggested for its palliation, and this, indeed, will certainly happen, if the parts at the extremity of the rectum are injured by too much handling, or subjected to the rude manipulation of an unskilful nurse.

Abercrombie proposes for the relief of this tormenting annoyance, injections of lime-water diluted with milk or thin arrowroot, some opiate being added. Opium, indeed, deserves our chief reliance, and besides being thrown up in these mucilaginous solutions, may be introduced in pill or powder, mingled with fresh butter or lard. Some recommend fresh melted butter to be injected in considerable quantities—half a pint at intervals.

Leeches applied at the margin of the anus, are occasionally very efficient in subduing pain and diminishing the restless urgency of the tenesmus, and I have seen similar palliation obtained by fomentations with a soft, tepid poultice of chamomile, or of hops or poppy-heads.

Hare urgently advises the introduction of O'Beirne's flexible tube above the sigmoid bend of the colon, and the injection of large quantities of mild fluid thus high up. This washing or purification he supposes to constitute a most important remedial application. This is the best mode, too, of introducing the enemata of nitrate of silver, so much recommended and often found so useful. A solution of 10 grains or more to the ounce of water—or, as some advise, more largely diluted will be well borne; while if merely thrown into the rectum, it will give intense pain.

In the earlier stages of the attack, we shall derive benefit, as I have said, from the use of stupes and poultices, warm and somewhat irritating, laid assiduously on the abdomen; and perhaps, if convenient, at the same period, the warm or hot bath would be found still more impressively derivative and sudorific. But, as the case progresses, we may find it necessary to have recourse to measures of more active and energetic revulsion. Epispastics may be laid, in succession, to the upper part of the thighs, and to the sacrum. Should these fail of sufficient effect, the whole abdomen should be covered with a vesicatory, which, if necessary, may be replaced again and again, when it heals so as to admit of the repetition.

There are certain general rules for the management of our dysenteric patients, which it may be of much importance to them to follow. "In no disease," says James Johnson, "is patience, on the part of the sick, a greater virtue, or more calculated to forward the good effect of medicine. If obedience be paid to every call of nature, the straining which ensues is highly detrimental, and augments, in many cases, the discharge of blood; every motion of the body, indeed, increases the desire for an evacuation." He strongly urges upon the sufferer, therefore, the necessity of resisting with fortitude, the urgent and almost ceaseless desire to rise to stool. Among the best means of control, in this respect, is the substitution of the bed pan for the easy chair; in the reclining or half-supported position in which the first is used, there is much less opportunity for the muscular exertion in bearing down, to which he feels too strong a propensity. And we thus gain, also, two farther points—his strength is better husbanded, and he is less exposed to sudden changes of temperature. To guard against this latter evil, it will be proper, in all exposed situations, as in army and navy practice, and in some hospitals, and the imperfect dwellings of the poor, to envelop the trunk of the body in folds of flannel. We should remember, in regard to this matter, that although the temperature of an apartment may be to healthy sensation sufficiently regular and comfortable, yet, there exists, in many diseases, and particularly in abdominal affections, a morbid sensibility to very slight changes. When fomentations are ordered, and when medicines are administered with a view to their diaphoretic action, very special caution will be requisite to prevent the occurrence of a chill on changing the clothes, or permitting the patient to rise. Care should always be taken, too, to keep the extremities as warm as the trunk of the body.

Every evacuation should be immediately removed, and the strictest possible attention be paid to cleanliness of the apartment, bed, and person of the sick. No one can doubt the propriety of this rule, whatever opinion he may entertain of the contagiousness of the malady under discussion, which, if admitted, would be felt to make its observance doubly incumbent upon us. Full and free ventilation must be insisted on, whether the season be warm or cold, while pains should be taken to guard the patient from all direct draughts or currents of air.

The drinks allowed during the progress of the case, should be of the mildest and least stimulating kind. The tormenting thirst which distresses the sick man, may be quenched with toast-water, strained gruel, arrowroot, etc., which hold in solution some proportion of nutritious matter. These and the aromatic infusions and herb teas which he may be using as drink, are supposed to be beneficially acidulated with some one of the mineral acids, of which the nitrous is selected as deserving a preference. It is alleged, that besides being grateful to the taste, and more serviceable in quenching thirst, they tend to diminish the sense of uneasiness and gastric oppression so much complained of.

I repeat here, an observation made in treating of diarrhœa, that large quantities of fluid, taken at once, are apt to excite the peristaltic movements of the intestines. We must, therefore, limit our indulgence by spoonfuls, which, however, may be accorded frequently enough to prevent any unnecessary suffering from thirst.

During convalescence, the lighter bitter infusions have been much relied on as tonics. Simarouba or common quassia, and colombo, are often employed. An astringent may be occasionally added with advantage, the kino being the best; and a little alkali, the carbonate of soda or of potass, will be found useful. Generally speaking, I trust rather to the mineral, than to the vegetable tonics, here, and prescribe the acetate or muriate of iron. The prussiate, also, has been highly recommended.

When dysentery is obviously of malarious origin, or has been connected with fever of remittent or intermittent type, it will be well to resort, as early as possible, to some preparation of cinchona. I would choose to administer the infusion, combining it with serpentaria, or small doses of camphor. The sulphate of quinine is generally preferred. In either formula, the addition of proper quantities of opium, may be required to check or control the abdominal irritation and disorder.

The diet of the convalescent should be nutritious, but light and unstimulating. Arrowroot with milk, rice properly boiled, chicken water, mutton broths, and unseasoned jellies, will furnish, at first, sufficient variety, while great attention must be paid to the observance of strict moderation in quantity. He may be gradually allowed an extending license in the use of the digestible meats—beefsteak, poultry, etc., but he should be cautioned, for some time, to avoid vegetables, especially those of acescent or flatulent tendency.

Gentle exercise, such as sailing, and riding in an easy carriage, may be resorted to as soon as his strength will allow. He should wear flannel next his skin, and observe the most scrupulous care in avoiding every exposure to night dews, damp air and abrupt changes. His feet should be guarded particularly from cold and moisture.

There are few disorders which exhibit so pertinacious a disposition to recurrence or relapse, and the difficulties of cure are indefinitely multiplied in every successive attack, until the unfortunate sufferer sinks exhausted, or the chronic form of the disease fixes itself upon him, than which there is no morbid condition more tedious, tenacious or distressing; poisoning, while it lasts, every source of enjoyment, and rendering even life itself an intolerable burden.

Chronic dysentery is usually the consequence of the acute attack imperfectly cured, or protracted indefinitely, until the immediate or more vehement constitutional sympathies have, in some measure, subsided; and the local affection of the mucous lining membrane of the intestinal tube becomes of prominent and paramount importance. It sometimes happens as the result of violent and unmanageable diarrhœa—a transition which, however natural and easily explained, has tended still farther to increase the confusion so often made between the two varieties of disease.

We meet frequently even yet with obstinate and tenacious cases of

Mexican diarrhœa and dysentery combined and intermingled, the result of the bowel complaints which in such numbers attacked our troops during the campaigns of 1847–48, and '49, in the southern regions of our continent.

It may be described as presenting nearly the same train of symptoms, already enumerated as constituting the history of the acute form, but in greatly diminished intensity. There is less soreness and pain in the abdomen; the calls to stool are less frequent and somewhat less urgent; yet the alvine movements are attended with sharp pangs and severe gripings, and the discharges are mucous and bloody, or ichorous, or muco-purulent, or sero-sanguinolent, mingled, occasionally with more or less feculent matter. There may be little fever, but an exacerbation is perceptible in the evening, and the nights are restless and uncomfortable; there is some appetite, variable usually and capricious, and indulgence in taking food is apt to occasion pain in the stomach and bowels, and to be followed by a call to stool. There is an annoying and constant thirst, and the tongue and mouth are of a deep red hue, and disposed to dryness. Emaciation goes on steadily, with loss of strength; œdematous swelling of the feet is noticed, first in the evenings, afterwards continuing through the day, with some puffiness of the face; the surface is harsh and dry, and of unequal temperature, the trunk being hot and the extremities cold; an unpleasant odor is exhaled from the body, and the breath is fetid; the abdomen becomes hard and painful on pressure; aphthæ cover the tongue and cheeks, and the unhappy patient, after weeks, months, or as the case may be, years of protracted torment, dies worn out with suffering.

Autopsy.—On examination, the mucous membrane is found extensively inflamed and ulcerated, the colon being generally the seat of such lesions. I have seen these ulcers as large as from a fourth to half an inch in diameter, and in great number. Coincident with this state of the alimentary tube internally, there are often found spreading inflammations of all the abdominal viscera, whose vessels are deeply injected, and whose external surfaces are agglutinated by deposition of organized lymph.

Some have doubted whether intestinal ulcers ever heal; but on this subject, as I before said of the stomach, there can no longer remain any reasonable question. Latham, Troilet, and others, have collected abundant evidence to establish the affirmative; and I have myself seen the process of reparation in several of its stages, and inspected the eschars of ulcers entirely healed.

The *prognosis* in chronic dysentery is, on the whole, unfavorable; although we are not permitted to despond. Few maladies are so intractable, few so likely to return, after a seeming cure has taken place. The favorable symptoms are obvious; such as show, on the one hand, a subsidence of the local irritation and inflammation, and, on the other, a progressive resumption of the natural and physiological functions of the parts affected. The diminution of the urgency and frequency of the tormina and tenesmus, the substitution of fecal for sanguinolent discharges and the improvement in weight, by proper filling up of the emaciated frame, will give fair reason for hope of ultimate, though probably irregular and distant convalescence.

In the *treatment*, we must lay principal stress upon the general management of the case. A careful avoidance of all causes of irritation is to be enjoined, whether affecting directly the alimentary canal, as in the use of improper ingesta; or indirectly through their influence upon the general system, as in exposure to moisture or atmospheric vicissitudes or residence in malarious districts. The patient should be kept very much at rest and in a recumbent posture, and spend most of his time in a warm and well-ventilated chamber. When the atmosphere is dry and genial, he may be indulged in a sailing excursion, or a ride in an easy carriage. He should wear the flannel roller over his abdomen, and take pains to keep his extremities warm and dry. His food should be light and nourishing; and as far as the stomach will bear it, consist chiefly of solids.

There is no very great certainty in the exhibition of any of our formulæ of medicine. Some advise a mercurial course, combining small doses of calomel or of blue mass, with cret. pp. or Dover's powder, repeating at proper intervals throughout the day, and administering full doses of anodyne at night to procure the alterative effect of mercury, with as little of its irritative influence upon the salivary glands as possible; and when ptyalism supervenes, it is best to desist from it at once. Some of the diaphoretics are alleged to exert beneficial powers here. James's powder, or the pulv. antimon. of the shops, and ipecac. in minute quantities are thus employed. I have derived advantage from the use of the infus. serpentariæ with camphor and opium.

The astringents, both mineral and vegetable, are constantly recommended, and much prescribed. Yet their efficacy is apt to be transient. Tannin is one of the best and most convenient; it must be given in full doses. The kino stands pre-eminent among them, and may be employed alone, or with some alkali merely, as the carb. sodæ and potass., or combined, as in the ordinary cretaceous julep. The other vegetable astringents, the catechu, pomegranate, etc., are not much relied on. Elliotson and Granville have highly eulogized the efficacy of the sulphate of copper, in these protracted cases. I am much better pleased with the effect of the acet. lead. It may be combined with ipecac. and opium. If the stomach be irritable, the most inoffensive of all formulæ will be found to be the addition of the requisite amount of acet. plumbi, to a mucilaginous solution of the acetate of morphine. This may be persisted in for a considerable length of time, too, without losing its influence, or annoying in any way.

The nitrate of silver deserves special mention here. It seems to be very generally applicable, and a patient perseverance in its administration will seldom fail to palliate the symptoms present, in a notable degree, if it does not effect an absolute removal of them.

Some of the intertropical practitioners praise loudly the nitric and nitrous acids, for their influence over chronic affections of the bowels generally—chronic dysentery among the rest. The former is combined with opium, in requisite amount, and advised to be taken for a considerable length of time. Like the salts of copper and silver just spoken of, it is supposed to exert some specific power locally, upon the mucous intestinal ulcerations, disposing them to heal, and, at any rate, correcting the foul secretions from the diseased surfaces. With similar views, charcoal, finely levigated, is offered, and is unquestionably useful to a certain extent. Abercrombie mingled it with pulv. Doveri, and thought it of service.

In attacks of long standing, it has been customary to resort to some of the terebinthinate or balsamic preparations. Pemberton and Cheyne unite in speaking favorably of the copaiva rubbed with some mucilage. Pemberton also recommends it as enema, for the relief of tenesmus.

I have seen the spirits terebinth. used in both ways, and in acute as well as chronic dysentery; and though a certain degree of diminution of suffering was obtained for a time, yet I cannot help suspecting it of ultimately injurious irritating consequences. I am unwilling to advise or trust to it. Creasote is preferred by a great number of skilful and experienced physicians to any other remedy under these circumstances. Carpenter recommends strongly a combination of sulph. quinine, nux vomica, opium, and ipecacuanha in proper proportion and dose. "It acts like a charm," he says, "snatching the patient from the very jaws of death." (*Trans. Amer. Association*, vol. v.)

I ought to mention that, in the history of this most obstinate and unmanageable disease, we have authentically recorded many strange stories of direct and unequivocal benefit, resulting from the most unpromising and capricious treatment. Such statements are worth preserving among "the curiosities of medical experience," although we cannot venture to guide ourselves by the analogies which they seem to suggest. Thus, there is often quoted in the books a case given by Forestus, of cure effected by indulgence in eating unripe apples; and the medlar and other harsh varieties of this very flatulent fruit are affirmed, by others, to have been similarly beneficial. I know a gentleman who, while suffering under chronic dysentery, which terminated fatally, after many years' protraction, resorted, by the advice of a farmer, to the free use of hard sour cider. This remedy, which he did not employ until the most extensive and faithful trial of all medical resources had resulted in a total failure, actually suspended for some time his tormenting disease; but even this lost at last its efficacy. Thus, also, we frequently meet in the newspapers and journals with wonderful relations of recoveries from chronic intestinal disorders, apparently promoted by indulgence of some morbid or whimsical appetite felt by the patient, who desires odd and revolting articles of food, such as cheese-parings, raw onions, rancid bacon, etc.

The best expectation of a permanent cure is to be founded, I think, upon a change of residence—a removal, indeed, if it be in the power of the patient, to another and distant climate. All changes of place and of habit seem to promise somewhat. All modes of travelling are serviceable, but if the saddle can be borne, a journey on horseback should be advised. A long sea voyage often makes a decided and favorable impression upon the constitution, by breaking up suddenly and thoroughly all established habits, and substituting for them a new train of movements. The direct and immediate effect of the tossing of a ship is, as every one knows, to interrupt the regular custom of daily alvine evacuations, and check the peristaltic action of the bowels, thus giving rise to costiveness, sometimes of long duration. This state of things is particularly favorable to invalids who have suffered from undue determination to, and morbid irritability of the intestinal tube, with too frequent propensity to stool. Such torpor is not only a condition of great comparative comfort to them, but occasionally, the harbinger of complete recovery, and even if ulcerations have taken place, it gives the best possible opportunity for the supervention of the healing process, and the formation of eschars.

CHOLERA INFANTUM.

Under this term, it has become customary with American physicians to treat of every form of bowel complaint to which children are liable beneath a certain period of age; yet, all seem disposed to admit that there is something peculiar or specific in the character of the cases thus referred to. Nay, some of them, Professor Potter, of Baltimore, for example, intimate clearly enough their belief, that cholera infantum is a distinct malady, exclusively confined to these United States, while they acknowledge the strong analogy presented in the similar affections described by Cruveilhier, Billard, and Copeland.

The history of the disease, usually received, differs little from that first given by Dr. Rush, and will be found to comprise attacks of cholera, properly so called; of diarrhœa, both acute and chronic; of dysentery also, in both forms; of atrophia ablactatorum, or true scrofulous marasmus; of bilious remittents, affecting children of tender age; and of febris infantum remittens, or worm fever. If any restriction of the name be attempted, I would prefer, with Copeland, to regard it as denoting an affection essentially pyrectic—he calls it *choleric fever*—and partaking of the nature both of diarrhœa and dysentery.

Its causes have been duly investigated. It has been attributed—justly, as it appears to me—to the irritation of dentition, to the influence of high atmospheric temperature, and to the effect of malaria, or air otherwise vitiated and impure.

I consider it as capable of arising from either of those causes alone, though their combined agency is, of course, much more efficient in its production. Hence it is often met with in unhealthy situations, liable to malarious diseases, at the commencement of the hot weather of our American summer, and when the child is teething. In our large cities, especially in their narrow, ill-ventilated lanes and alleys, it prevails usually, though it is not unknown even in remote country places. Cases occasionally, though perhaps rarely, occur in winter; these we may ascribe simply to dentition; and in situations where it is familiar, it makes its appearance early in the summer—even in April and May—when few or no other malarious attacks have yet been noted.

The greatest number of instances present themselves in May, June, and July. It seems also most rife in seasons otherwise unhealthy. Dentition predisposes to it so strongly, that children between eight and fourteen months old, at the beginning of summer, rarely escape an attack, of greater or less violence. The attempt to wean a child while teething, and the substitution of paps and other kinds of improper food for its natural and healthy aliment—breast milk—often prove fatal, by exciting a diarrhœa, which soon becomes irritating and pyrectic. The unwholesome secretion from the breast of a pregnant mother, called by the nurses, not improperly, "bad milk," is very apt to disturb and annoy the stomach and bowels of a teething child.

These disorders may follow, indeed, the use of any indigestible or inappropriate food. Fruit is among the most common causes of them, a point concerning which, I am obliged to differ from Dr. Rush, who expresses his belief, that a moderate use of ripe fruit rather tends to prevent, than to induce them. In the stomach of early childhood, there is little power of assimilating vegetable aliment of any kind, and it is probably altogether incapable of the assimilation of the acescent vegetables. Before children have cut a sufficient number of teeth, or have properly learned the use of them, they are apt to swallow their food unchewed, and unmixed with saliva. They ought to be taught to masticate all solid articles given to them, and especial precaution should be taken as to those matters which they are fond of, and, if left to themselves, will swallow greedily and in haste. I have, without doubt, seen many instances of cholera infantum, induced by the use of ripe fruits, and in some of them in but moderate amount. Inter multos alios—I recollect a fine boy, only son of a gentleman of this city, who was quite well before eating a part of an orange; in less than an hour after, he was seized with colic, followed by vomiting and purging, of which he died. I have seen death twice follow promptly the eating of nuts, by children who chewed them imperfectly.

Exposure to abrupt and improper atmospheric vicissitudes, also, and inattention to the requisite changes of clothing, often give rise to attacks of this sort; a strong predisposition to which is generated by uncleanliness, whether of person, garments, or chamber.

The most fatal modification of cholera infantum, is that which supervenes upon a scrofulous diathesis, hereditarily derived; and hence we find it specially frequent and mortal in certain families, whose hopes are thus cut off in the bud, during a long procession of years.

I will attempt a brief detail of the symptoms which present themselves, in the most ordinary class of cases. The attack usually commences with fretfulness and inquietude. The child is more uneasy at night; its lips are hot, and its mouth parched; it seems to be in pain, and when it doses, moans and starts. Vomiting is frequently one of the earliest marks of disorder, or the stools are observed to be watery, passed urgently, rather abundant, and unduly frequent. They are variously altered in hue, being clay-colored, or green, or sanguinolent, or muco-purulent, and very often offensive and acrimonious.

I have already said that I agree with Copeland, as to the pyrectic character of this affection. There is very generally some febrile excitement present, at some period of the twenty-four hours—being usually most obvious in the evenings. If dentition is going on, the child bites his fingers, or anything put into his hands; his gums are swollen and inflamed; his head is hot, and he shrinks from light, and is annoyed by sound; he grinds his teeth, both when asleep and awake. After a time, in almost every variety of case, if not uniformly, diarrhœa prevails, and becomes the symptom of paramount importance; dysenteric appearances not unfrequently present themselves, in addition, the discharges consisting of mucus, colored with pus or blood, and passed with violent straining, fretting, and crying. The belly becomes tumid, and pressure is complained of as giving pain; the tension is often elastic and tympanitic. The child lies on his back, with his feet drawn up, tossing his arms, and rolling his head from side to side. An annoying cough sometimes supervenes; emaciation progresses rapidly, with great muscular feebleness; the pulse is frequent, quick, and weak. The lips and lining membrane of the mouth are fiery red, polished, and dry; in protracted cases, ulcers show themselves upon it, usually aphthous and superficial, but occasionally deep, destructive, and severely painful. The extreme emaciation which belongs to these latter stages, gives to the countenance a most ghastly expression, remarkable above all in scrofulous subjects, whose marasmus is owing to innutrition, from the enlargement and induration of the mesenteric glands, and general failure of the assimilative functions. As death approaches, the little sufferer is moaning and languid, but still restless; the eyes are injected, with an inflamed look, though perhaps quite insensible, flies having been seen to light on the cornea, between the half open lids, without exciting notice or motion; there is sometimes a muttering delirium, the patient wasting his little strength in vain, unquiet struggles, and even biting at its nurse's or its own hands. Livid spots sometimes form on the surface, and coma and convulsions are the immediate precursors of dissolution.

The *duration* of the disease varies much, observing a correspondence with the forms it is wont to assume. The modification above described, chronic diarrhœa, or marasmus, as it is often called, may be protracted for weeks or even months. I have seen it put on the shape of true cholera, in which the irritability of stomach was the most urgent symptom, and the little patient sunk exhausted by the irrepressible vomitings, and the frequency and quantity of the serous discharges from the bowels. I have known cases of this sort terminate in twelve and twenty-four hours; the alvine discharges consisting of the serous or albuminous fluids, so abundantly effused in cholera maligna.

I do not entertain a doubt that verminous irritation may excite this state of disease in young children, or may complicate with it their familiar symptoms; hence we find some writers enumerating under this head, all the phenomena which go to show the presence of worms —irregular bowels, capricious appetite, foul tongue, fetid breath, convulsions, etc.

A hydrocephalic variety is also recognized by some authors, because of the gastric and intestinal disturbance so often connected with this cerebral affection.

The *post-mortem appearances* must differ with the nature of the attack. In the rapid cases just mentioned, little change of condition is to be observed. In two such, I found a very slight blush overspreading the external surface of the stomach and intestines; I could perceive no alteration of the internal or mucous coat. In chronic dysentery, this tissue offers abundant traces of inflammation, and is occasionally found ulcerated. The mesenteric glands are often enlarged and indurated.

The *treatment* of cholera infantum will require to be varied with the diversity of forms which it presents, and with its different modes of access or invasion. Like the cholera of adults, it often arises from some temporary cause, some transient mode of irritation. Improper food may have been taken, or some excess of ordinary diet committed. The primæ viæ will, for the most part, be thoroughly evacuated by the early discharges upward and downward; but if not, a mild emetic of ipecacuanha or a moderate dose of castor oil may be given, to obtain the complete expulsion of all crude or undigested matters. After this, we must resort to the soothing management. Aromatics and anodynes must be administered in efficient doses. The best combination of these is the old fashioned *paregoric elixir*, a very happy union of several useful ingredients. Laudanum fomentations should be applied assiduously to the abdomen, and friction made with warm laudanum, to the spine and limbs. The stomach is occasionally in so stormy a state that nothing can be swallowed or for a moment retained, not even the water for which the little patient, in the torments of an intolerable thirst, cries urgently. We must depend, here, upon the administration of our opiates in enemata. These are to be made of mucilaginous solutions containing a proper proportion of tinct. opii; they should be thrown up gently and carefully, and repeated pro re nata. The warm bath should in the meanwhile be resorted to, and sinapisms applied to the trunk and extremities.

When the attack arises from the annoyance of dentition chiefly, there occur, superadded to the ordinary symptoms, or combined or alternating with them, the effects of undue or morbid determination to the brain. The child cries much, shuns the light, appears distressed by noise, starts at sudden sounds, throws its hands up to its head, which is hot, and its cheeks flushed, while the feet are apt to be cold; the gums are swollen and red; there is great thirst; the bowels are irregular, being sometimes costive, at others loose, with griping. It is often proper to scarify the gums, and when this is done, we should pass the instrument used, down upon the tooth, relieve the tension of the membrane, and bleed it freely.

Beyond this local aid, we must relieve the organ principally assailed, the brain, by such means of revulsion as are best adapted. If the bowels are confined, we must exhibit a purgative. Castor oil answers well in general. Some prefer the combination of rhubarb with magnesia, or with calomel. I have no objection to either, although Rush expresses, I know not why, a strong dislike to the use of rhubarb in any of these cases. The head, meanwhile, must be kept cool by proper refrigerants, and the extremities well wrapped and warmed, and somewhat irritated by sinapisms. If convulsions threaten, or coma supervene, cold affusion on the vertex must be had recourse to; and, if the pulse do not forbid, leeches applied behind the ears, to the angle of the jaw, or upon the temples.

In that type of cholera infantum which I have described as the most common among us, and have attributed, in part, at least, to a malarious origin, the stomach appears to be the primary seat of the disorder; this soon extends itself to the rest of the chylopoietic viscera, deranging variously the function and condition of the liver, and bringing on a diarrhœa, which exhibits a remarkable proclivity to protract itself, becoming chronic, or run on into dysentery.

In the earlier stages of this modification, many practitioners are in the habit of employing emetics; and I have seen some benefit from them, when the tongue is foul and the breath fetid, with anorexia and nausea, with or without retching. I prefer the ipecacuanha, but even this mild article I am unwilling to repeat frequently. Of the cathartics so generally employed, the least irritating should be chosen; and for this, among other reasons, I select calomel. The mercurial is especially indicated when there is torpor or obstruction or engorgement of the liver, which may be detected by fulness or intumescence of the organ, perceptible on examination, or shown by clay-colored stools. We may find advantage, also, in the use of the muriatic acid bath, as a pediluvium for the little patient, whose feet and legs are to be kept immersed in it for some minutes at a time, at intervals. Whatever laxative be exhibited, it should be given in moderate doses, and at such periods of repetition as shall keep the bowels gently moved, and regularly, so as to prevent that alternation of looseness and costiveness, so common and so injurious.

It is a good custom to add some alkaline preparation to all our formulæ. The digestive function is, of course, greatly impaired, and the contents of the stomach are apt to undergo a constant fermentation, giving rise to the presence of an irritating acid. Alkalies not only correct chemically this vitiation of the fluids effused or taken into the stomach, but they exert some peculiar power beyond this, in tranquillizing and giving tone to that organ. Where constipation exists, magnesia may be chosen; if, on the other hand, there is diarrhœa, lime-water, or the carb. sodæ, or potassæ should be used.

When we have reason to suspect the presence of worms in undue number, productive of or increasing the abdominal disturbance, we must resort to some anthelmintic remedy. Of all the vermifuges, I regard camphor as most deserving our confidence, and would propose an aromatic infusion of it, as an eligible basis for such other medicines as may be indicated. Even when we fail to procure the expulsion by it of any of the troublesome parasites aimed at, camphor rarely fails to soothe those annoyances which are imputed to them. The infusion of spigelia acts in a similar way, though, I think, with somewhat less certainty, and if pressed too far, will affect unpleasantly the nervous system, occasioning double vision, strabismus, and even convulsions. It is, perhaps, as a mild narcotic, that the spigelia is useful here, diminishing sensorial and vascular excitement. Camphor may, perhaps, exert a like operation, though the question is unsettled whether it is prominently a stimulant or sedative. As an aromatic, in diffuse solution, as I employ it, I consider it to be a tonic and cordial diaphoretic, pleasantly stimulating the stomach, and by determining to the surface, restoring the impaired circulation and action of the cutaneous vessels.

To promote this centrifugal determination, we shall find the warm bath an admirable auxiliary. Children placed in it in a condition of severe suffering or heavy languor, often revive promptly, and reassume an unexpected degree of cheerfulness and playfulness. When the temperature of the body is unequal, the head hot, and the extremities cold—when the abdomen is tense and intolerant of pressure, the stomach uneasy and urged with frequent retching, and the muscles agitated with cramp or spasmodic twitching or convulsions, the bath should be resorted to. Where there is great debility, it may be made stimulating by adding salt or mustard, cayenne pepper, or ardent spirits. Warm wine, suggested by Rush, is too expensive to be among the resources of practice in this country. Some children, ill-managed in health, have so great a dread of water, that we cannot get them into the bath without an unpleasant and, perhaps, injurious struggle. In such cases, and when any other contingencies offer an objection to the immersion of the patient, we may substitute fomentations and poultices. Of all these, heat and moisture combined form the common remedial principle, and we indulge mothers and nurses in the choice of any of them which they may fancy to be specially applicable. Ordinary bread or meal, aromatic herbs crushed and stewed, spongiopiline and flannels soaked in hot lye, and hot spirits, afford sufficient variety.

I am by no means in the habit of urging the mercurial treatment in cholera infantum, yet it is not to be denied that, in certain cases, we may derive very great benefit from the cautious employment of calomel as an alterative. The well-known aspect of our low country children, born in the neighborhood of swamps and ricefields—the sallow visage, with puffed eyelid and cheek, emaciated limbs, and tumid belly, will often improve under this course and no other. I usually add to the mercurial a certain proportion of opium and ipecacuanha. A child of twelve or fifteen months, may take ¼ or ½ grain of the former, with 1 grain or 2 of Dover's powder, every third or fourth hour. This combination determines to the surface, corrects the morbid secretions of the disgestive tube, allays febrile excitement, calms the intestinal irritation, disgorges the swollen liver, and subdues tormina and tenesmus, thus substituting tranquillity for restlessness, and inducing quiet and refreshing sleep. Dr. Miller, of New York, in one of the earliest treatises on this disease, urges a resort to mercurial frictions. I have no experience with them. If the stomach will not bear the Dover's powder, opium must be given in some other form. The alkaline diaphoretic mixture may be alternated with the mercurial.

Epispastics are still employed by many physicians, among the means of revulsion in these cases; but for my own part, I have great reluctance to inflict a vesicatory upon an infant, if it can be avoided. The delicate skin suffers much, at this age, from the painful inflammation thus produced, which often becomes diphtheritic, or extends widely, assuming an erysipelatous character, and is exceedingly slow to heal, ulcerating deeply in patches, or giving rise to annoying boils. Sinapisms or poultices with mustard, will act more promptly, and will effect everything that can be desired from revulsives.

It is almost unnecessary to direct attention to the assiduous employment of astringents and tonics, when the diarrhœa has run into the chronic condition, and is, by its protraction, wearing out the strength and constitutional resources of our little patient. Of the mere tonics, colombo and cinchona have been generally preferred; but it is difficult to administer bitter medicines to young children. Some resort to arsenic and iron, but I must confess, that they have not proved of the advantage I had hoped for in these cases, and I place no confidence in them. One of the metallic preparations has, however, gained of late a good deal of reputation here, the nitrate of silver, which is affirmed to exert a peculiar and unequalled influence in controlling the gastric and intestinal disturbance, restraining the morbid secretions and restoring the functions of the affected tissue. The dose is, of course, a small one, from $\frac{1}{12}$ to $\frac{1}{8}$ of a grain, repeated every third or fourth hour. Of astringents we have in our hands a large number and variety, but they must not be indiscriminately used. An almost universal preference is adjudged to the kino, both by the French and English physicians, who were long anticipated however, in this matter, by our countrymen. It is, indeed, an invaluable remedy. Some would restrict its adaptation within narrow limits, and advise to abstain from its use whenever fever or intestinal inflammation are observed to be present. This view of its utility, appears to me to be a mistaken one. It seems applicable in all protracted cases occurring in children, and I have not found it necessary to wait either for the subsidence of symptomatic fever, or the subdual of inflammatory irritation, to obtain its good effects. The best formula for prescribing it, is the familiar one of cretaceous julep, to which may be added with advantage, a proper proportion of opiate, either in the old elixir paregoric, or as combined in the Dover's powder.

Among the domestic astringents in good repute among nurses, there are some quite serviceable. An infusion or tincture of the rind of the pomegranate—an infusion of the root of the dewberry or high blackberry, of galls, and of logwood, are all much employed. Dr. Miller, already quoted as an early authority on this subject, extols the common alum as well-fitted to do good. He administered it in doses of 1, 2, or 3 grains, combining with it some anodyne, such as Dover's powder. The acetate of lead is a frequent and favorite prescription with me, apportioning the dose carefully to the age of the infant. I dissolve it in some mucilaginous mixture, to which I add a small amount of the acet. morphine, or tinct. op. camph. It is willingly taken, and besides its astringent effect, certainly seems to control the irritability of stomach so often present.

The selection and employment of well-adapted enemata, will aid us much in the management of this troublesome disease. In the earlier periods of an attack, if it be our object to obtain free evacuation of the crude and feculent contents of the alimentary tube, and thus to diminish the general morbid excitement, we may throw up into the rectum tepid water alone, or containing a little salt or molasses, or olive or castor oil. After this, the mucilaginous solutions will be found serviceable, and they may be made vehicles for our opiate, or mingled with astringents, either vegetable or mineral, as the solution of acet. plumbi or the infusion of pomegranate rind, or of logwood or galls. These should be injected cold and in small quantity, and retained by external pressure.

Much will depend upon the general regimen observed. The diet requires especial care. Such articles deserve a preference generally, as are least liable to undergo acescent changes. If a child has been weaned too early, return it to the breast of its mother, or provide a healthy and suitable wet-nurse for it. If it has been weaned at the proper age, substitute for its mother's breast milk, now no longer procurable, diluted milk from the cow, tepid, with a little sugar. This is by far to be preferred; but may disagree. Thin corn or rice gruel, arrowroot, coontie, boiled biscuit or bread panada, may be tried in succession. Broths suit well with some children, as chicken, veal or mutton broth, or beef tea. Others suck the juicy meats underdone. The books record strange perversions of appetite under these circumstances. Dr. Rush mentions a child of sixteen months, who recovered on a diet of rancid cheese and port wine drank undiluted. They are often pleased with strong flavors, and become fond of salt fish and salted meats. I have seen children in a moribund state, exhibit this tenacious fondness for ham, which they held in their hands, constantly sucking.

The clothing should be warm, consisting of flannel or cotton, according to the season. When the weather is damp or chilly, or changeable, the flannel fold and roller, applied about the abdomen, will be found useful. Perfect cleanliness of the person, the bed and body clothes, and the apartment of the child, must be enjoined. Removal and change of air must always be regarded as one of our most efficient remedies. It is of importance that we should not too long delay the experiment, and, if well timed, we shall find that the mere transition from the confined streets of a city to the open fields, the elevated ridges of pine land, or the sea-shore, is of itself and at once restorative.

When it is in the power of the parents, children born and resident in cities, should always spend a part of the year in the country. The results of all observation go to show, that the concentration of large masses of human beings, however advantageous it may be to their progressive intellectual development, has an inevitable tendency to occasion their ultimate physical deterioration. This is, at first, and most strikingly, notable in the degenerate vigor and imperfect growth of their children; and it is during this early stage of life that disease assails, and predispositions are formed, and the constitution takes so often a morbid bias.

Children should have free exercise at all times, and in every mode suited to their age and physical powers. They should live as much as possible in the open air; sunlight is as important to animal as to vegetable health. Their dress should be attentively accommodated to atmospheric vicissitudes, guarding them from cold and moisture. Their sleeping apartments should be elevated and dry, and cleansed and ventilated perfectly and always. Cleanliness of person and clothing must be strictly enforced. The bath should be used daily—cold, if it be well borne and the subject robust; tepid for infirm and delicate children. They should not be weaned until dentition is sufficiently advanced for the effectual mastication of soft solids. During the process, the gums should be examined from time to time, and swelling and inflammation relieved by incisions. After weaning, the diet should be as above indicated, allowing a latitude proportioned to the appetite and obvious powers of digestion in each little subject. Crude vegetables should be forbidden, and fruit permitted in very small amount, if at all; animal food may form a gradually increasing proportion of the diet.

These general rules of regimen and diet require to be attended to with most peculiar care, in families where there is reason to suspect the prevalence of a strumous diathesis. If the mother have suffered from any of the forms of open scrofula, or, being a descendant from a scrofulous stock, has exhibited the well known tokens of that vicious constitution, I would unhesitatingly advise, that the child be taken early from her and put to the breast of a healthy nurse. None have ventured to deny, that an infant nourished from such a morbid source, is likely, sooner or later, to fall an easy victim to predispositions thus engendered or made more intense.

INTESTINAL WORMS.

The human intestines are scarcely ever found entirely untenanted by certain familiar species of worms, besides being subject to the accidental presence of rarer varieties. Those most frequently met with, are the lumbricus, ascaris, and tænia.

The *lumbricus*—ascaris lumbricoides—round-worm, is the most common of the human entozoa. Children may be said to be almost uniformly subject to the presence of the lumbricus, and indeed adults also. Their existence in the body does not seem productive of any necessary or definite effect, and is often unthought of until after they have been expelled. From the fact thus alleged of their universal domiciliation in the bowels, and their occasioning no definite mischief unless when in extraordinary number, or when, from some incidental change of condition, the system is enfeebled or rendered irritable, Parr was induced to describe them as "forming a part of a healthy constitution and as scarcely injurious but from accidental circumstances." Nay, our own Rush, with an unaccountable perversity, not only inferred their harmlessness, but even believed in their absolute utility, and suggested that the want of them might sometimes occasion disease in children.

Now, although it cannot be denied that they have been known to infest the bowels, for great lengths of time, without giving rise to any notable evil, yet, on the other hand, it is perfectly certain that, whether as cause or effect, their existence in any considerable numbers is usually coincident with a depraved state of the general health, and with an infinite diversity of morbid symptoms, to be hereafter spoken of. Individuals of lymphatic temperament, such as inhabit low and damp localities, and subsist on scanty or gross and indigestible food, are most obnoxious to them, and the multitudes generated in the bowels of such subjects are prodigious. In the examination of the body of a negro girl, about 10 years old, we found it impossible to take hold of any portion of the intestines without including between the thumb and finger one or more lumbrici. I have known thirty at one time, and at another forty of these worms expelled in one evacuation. In the case of a poor emaciated and miserable humpback, a black boy of about fourteen years, I saw a mass which had been discharged in the course of a single night, amounting, as I was assured, and as seemed probable from appearances, to not less than one hundred and sixty.

This worm is, as its name imports, of round elastic body, with a smooth shining surface of a whitish or yellowish hue, from five to twelve inches in length, of about the thickness of a writing quill in the middle and tapering to the extremities, of which the anterior is most attenuated, commencing abruptly by three tubercles which surround the mouth. The lumbricus was once supposed to be of the same class with the earth-worm, which it certainly resembles a good deal; but a minute examination shows many essential and striking points of dissimilarity both in the external and internal structure. Thus, for example, the earth-worm is hermaphrodite; but in the lumbricus, there is evident distinction of sex. It usually inhabits the small intestines, but is found in all parts of the abdominal canal, being known to crawl from the anus, and not unfrequently coming up the œsophagus and finding its way with coughing or vomiting, excited by its tickling motion, through the mouth and nostrils.

The *ascaris vermicularis*—ascaris—thread-worm—maw-worm, inhabits in masses composed of large numbers, the cavernous cells of the colon and rectum. It is round, white and highly elastic—filiform in appearance, from one-fifth of an inch in length to an inch. The sexes are separate, the males being smallest. "The vivacity," says Brera, "with which it skips and bounds is amazing. If touched with the finger or brought near the flame of a candle, it contracts very remarkably. It is, perhaps, to the vivacious contractility that we are to attribute those enormous irritations of the intestines and especially of the anus, which torment those infested by them."

The *trichuris*—tricocephalus dispar—tailed thread-worm, is usually enumerated among the intestinal worms. It is very rarely met with and therefore, perhaps, deserves to be regarded rather as a pathological curiosity. It is an inhabitant most commonly of the cæcum and colon, seldom seen in the small intestines, and has been found occasionally loose in the abdominal cavity, having perforated the coats of the intestine. For about two-thirds of its length, it is of capillary slenderness; the remaining portion is thicker, terminating obtusely. Professor Lanza, of Naples, mentions the singular fact that worms of this species were very constantly found in the intestines not only of cholera patients but of those who died of other diseases during the prevalence of cholera in that city in 1836 and 1837; and were not found after the cessation of the epidemic.

The *tænia*, or tape-worm, is one of the most annoying and injurious of all the parasitic entozoa. It infests a great many animals, and is met with, not unfrequently, in man. Two species, which naturalists tell us belong to different genera, are found in the human body, and these are said to observe a marked geographical or national distribution. "The Swiss and Russians," says Owen, "are troubled with the bothriocephalus latus; the English, Dutch, and Germans with the tænia solium; both kinds occur, though not simultaneously in the same individual, in the French." The former, he says, may be readily distinguished from the latter, by the shape of the segments of which it is composed, which are of greater breadth than length, by the position of the genital pores in the middle of one of the flattened surfaces, and not, as in the tænia solium, at the margin of each segment, and by the head which is elongated, with two lateral longitudinal fossæ, instead of the four round oscula, characteristic of tænia proper.

The tænia solium, which is the true tape-worm that we are most likely to meet with, consists of flattened, whitish-looking pieces or segments, separate joints, once regarded as a special variety, the lumbricus cucurbitenus of Heberden, so called from their somewhat resembling gourd seed. It attains sometimes a great length, from ten feet to many yards. Brera says there is one in Padua two hundred and thirty feet long. Wilson, in a case recorded in the *Philadelphia Journal*, says that three hundred feet, at least, had been discharged by the patient. The worm is usually solitary, but not always, so that the pieces collected may belong to or constitute parts of several individuals. I saw on one occasion ten yards brought away from a female patient, eight of which were connected, the remainder being in small pieces. In each piece there is an ovary, containing often a prodigious number of eggs, expelled, when mature, through apertures in the margins. The animal is a hermaphrodite or androgynous. It inhabits the upper part of the intestinal canal, and is supposed to feed on the chyme and other nutritious juices imperfectly animalized. The head is usually towards the upper portion of the tube, and is said to fix itself in the mucous membrane firmly, by means of fangs or hooks. We know it to be very difficult to dislodge, and unless the head is brought away, the patient is by no means freed from the worm. It is affirmed to be in a peculiar degree tenacious of life. We are assured that "they have been known to live for hours, vigorous and active, in boiling veal broth." The head, for which we should examine with great care, is small, nearly hemispherical, broader than long, and truncated anteriorly; its four mouths or oscula are situated on the anterior surface, and furnished with a double circle of small reversed hooks.

The origin of these parasitic entozoa, is a question of extreme difficulty and obscurity. They are found in existence nowhere but in the situations indicated within the bodies of other animals; and they all perish in a brief period after their expulsion or removal. They all increase by ordinary propagation, however, and multiply in vast numbers. That there are particular conditions which foster their increase is evident. The national distribution of the several varieties of tapeworm has been mentioned. Nothing is better known than the greater liability of children than adults to the annoyance of lumbrici and ascarides. This liability is most notable between the time of weaning and the age of puberty; perhaps from the third to the eighth year of life. I have seen but two unweaned children much troubled with them, each about one year old.

They are apter to prevail in individuals who live on a poor and innutritious diet, and whose organs of digestion are by any cause or causes enfeebled. Hence, from transmitted peculiarities, there has been supposed to be in some families a hereditary verminous tendency. It has even been maintained that they cannot resist or sustain the action of the perfectly healthy secretions of the gastric and intestinal surfaces, endowed as they are with powerfully solvent properties; but this notion is untenable, as their presence is consistent with the enjoyment of the best health, and they are frequently discovered accidentally in persons who have suffered under no mode of disorder.

The *effects* of verminous irritation are exceedingly diversified. It is indeed to be doubted whether there are any peculiar or characteristic phenomena which serve clearly to show the presence of the most common, the round worm, or *lumbricus*, nor can we clearly point out any symptoms as being definitely connected, even with their inordinate numbers, in the constant relation of cause and effect. "There is scarcely a disease," says Rush, "or symptom of a disease belonging to Cullen's class of neuroses, which is not produced by worms." Febrile affections are often derived from this source, and I have already treated of ordinary "worm fever." Among the infinite series of maladies ascribed to lumbrici, I will merely enumerate epilepsy, chorea St. Viti, hydrocephalus, and many varieties of pulmonary and bronchial disorder, as shown by cough, diarrhœa, and atrophy. The train of symptoms developed in connection with the presence of the worms, seems to be influenced much by the constitutional predispositions of the subject affected, and they bear a relation as well to the mobility and sensibility of the patient, as to the number of worms present. During the age at which children are most liable, their intestines abound with a tenacious mucus which offers a convenient nidus to these vermin. At this time, too, they are apt to eat without caution, and immoderately, of everything in their reach.

Among the symptoms alleged to be most commonly produced by the presence of lumbrici, we may specify the following, as familiar to parents and nurses, though by no means unequivocal in their import, or decisive as to the existence of an exclusive cause. The child is languid and fretful, his appetite is irregular, often deficient, but sometimes voracious; the abdomen painful and tumid, stools loose and offensive, with straining and griping, the tongue foul, and the breath fetid; there are emaciation and loss of strength; the sleep is uneasy, with moaning, starting, and muscular twitching; the patient grinds his teeth, and picks his nose; there is occasionally a teasing dry cough, with more or less febrile excitement, at uncertain periods and intervals;

determination to the brain is a frequent attendant, with frightful convulsions. Yet, although the concurrence of many or most of these phenomena in any case would justify us in regarding it as verminous, and treating it accordingly, the expulsion of worms is the only proof of their agency, if even this be regarded as sufficient. Indeed, it has seemed to me, in more than one instance, clear that, although they were brought away by the evacuants employed, there was no good reason for ascribing to them the disorder of the patient.

I shall not go at length into the discussion of the remedies for lumbrici, the anthelmintics of the materia medica. These medicines are too powerful in their specific influences to be employed promiscuously, or in mere reference to their vermifuge property. The choice should be carefully adapted to the actual pathological condition of the patient. If the principal irritation affect the nervous system, we will do well, for the most part, to avoid the narcotics, spigelia, melia azedarach, etc., and employ the cathartics, as calomel, castor oil, turpentine, etc., which, in their turn, become improper when the bowels are excited with diarrhœa; and so of the rest.

It is a difficult thing in many individuals, to prevent their rapid multiplication and often recurring annoyance. The free use of salt is urged by one, as prophylactic; the occasional administration of wine, of pungent articles of food, as cheese, onions, garlic, and the like, by others of equal authority. I have been best satisfied with the exhibition of camphor, in very diffuse mixture with water, as in domestic practice among the Italians. A drachm of the spts. camphorat. being mixed with ℥viij of water, and made in any way agreeable to a child, he may be induced to take this quantity during twenty-four hours, for many days in succession. Whether it be that the aroma of this substance is peculiarly disagreeable to the lumbrici, I will not pronounce, but I have known many of them come away from the body during this course, to the great relief of the patient.

The thread-worm, *ascaris vermicularis*, produces either no annoyance at all, as is said to be the fact with regard to the trichuris, or it gives rise to more definite symptoms than the lumbricoides. These are described as follows: there is great uneasiness in the rectum, and an intolerable itching of the anus, seldom troublesome before the evening, and much aggravated on going to bed, with heat in the part, and tenesmus. These little creatures are found in the stools, entangled in a bloody mucus, and sometimes in the beds of children, having crawled forth spontaneously. They are exceedingly difficult to get rid of, so that many persons have passed their lives, without ceasing to be troubled by them. They are not absolutely confined to the lower intestines, but are also met with in the stomach, whence one of their names, maw-worm. They then give rise to indigestion, with "an uneasy, faintish feeling at the pit of the stomach; a capricious or depraved appetite; pains in the abdomen, with itching and redness of the nose."

The best relief seems to be given by active purgatives and aperient enemata. Of these latter, I have seen the best effects follow from the administration of solutions of aloes and of assafœtida; warm milk and oil used in this way, diminish the tenesmus; camphor, turpentine, and the essential oils, are also of benefit. Brera recommends their mechanical extraction, by introducing a bougie or candle into the rectum, smeared, as others advise, with mercurial ointment, which, when drawn out, often brings away great numbers. Howship proposes the occasional introduction of the finger for the same purpose.

These palliatives are much aided by a proper attention to the diet and habits of the patient. The former should be simple; doubtful articles, both of food and drink, being abstained from. The bowels should be kept regularly soluble, either by laxatives, or by occasional enemata; and great cleanliness of person observed. This injunction should be specially attended to by females, in whom pruritus vulvæ may be brought on by their irritation.

TÆNIA, or tape-worm, deserves at our hands a more particular consideration. It is of the tænia solium that I am about to speak; the lata or bothriocephalus I have never seen. The influence of the presence of this worm has been variously described by many writers, the majority of whom admit, without hesitation, that it may exist long in the body without occasioning any disturbance whatever. Its proper habitation is the upper and smaller intestine, and some suppose that it only becomes annoying when, by its growth, it has extended into the larger portion of the tube. It surely does happen, as I myself have known, that portions of the worm, or joints, have come away from individuals, apparently in excellent health. That it does present itself low down in the bowels, is strangely proved by a case recorded in the *Med.-Chirurg. Journal*, in which it is mentioned "that the patient was in the habit of ridding himself of large fragments of his tormentor, by introducing a stick into the rectum, and twisting it round the worm till it broke." It is still questioned whether there are any symptoms which distinctly prove the presence of tænia, previous to the expulsion of one or more fragments of its body. I think there are none such; yet the concurrence of morbid sensations is somewhat peculiar, and not likely to happen in any but those who are suffering from this parasite. Louis gives us the results of his observations of ten cases at La Charité. Among these were a father and son. I have had under my care, an old gentleman and his great-grandson; from which facts may arise suspicion of predisposition hereditarily transmitted. In almost every case on record, there seems to have been a voracious, though somewhat irregular appetite. My patients have, with scarcely an exception, complained of a dragging sensation, attended with cramps, and a perception of uneasy or convulsive movements in the bowels. There is pain in the abdomen, which some describe as colic, and others speak of as peculiar and indescribable. Some are teased with diarrhœa, others merely with tenesmus. Some emaciate, others do not. My first two patients presented, in this respect, a most striking contrast. One, a male, was a skeleton, completely atrophied; the other, a female, was very plump and in good condition. Dr. Baillie recites, as the symptoms most indicative of the presence of tænia, "a gnawing, uneasy feeling in the region of the stomach, diminished or removed by eating;

an appetite commonly somewhat voracious, though occasionally deficient; frequent nausea, colics, and vertigo." Louis states that the functions of the body generally were impaired, in all his cases, though in very different degrees.

It is singular, that when joints of the worm have begun to come away, this does not only show itself in the stools, but pieces are found in the beds of the patients, and fall from the anus, at times, while they are walking.

In the *treatment* of tænia, I have no hesitation in adding my testimony to the abundant records of the efficacy of the spiritus terebinthinæ. I have not failed to bring away more or less of the worm, in every case in which I have resorted to it freely, but the doses required may be large. From one to two drachms are generally given, at intervals, either alternating with, or followed by proper doses of castor oil. Fenwick prescribed two ounces, to be repeated in two hours, if no effect was produced, and even a third time, if required. Exhibited in this way, I had the satisfaction to see expelled from a female patient, as I have already mentioned, not less than ten yards in one day, of which eight yards were in connected segments, the rest consisting of loose joints. This lady remained a long time well; indeed, I know not that she was ever annoyed with tape-worm again, although I failed to find the head, for which, as I said, we are enjoined to make diligent search. There is, perhaps, some risk, in these large quantities, of producing strangury and irritation of the bowels. My patient suffered for a short time from the former. Professor Elliotson has carried this plan so far, as to administer two or three ounces of turpentine every second day, for a fortnight, taking care to follow every such dose with castor oil, which, purging briskly, at last expelled the worms.

Bremser, one of the best authorities on this subject, speaks with highest eulogy of an empyreumatic oil (Chabert's), made by mixing empyreumatic oil of hartshorn with oil of turpentine. Rudolphi and Brera also recommend it as a most valuable vermifuge. If given too largely it may excite, however, a severe and troublesome degree of intestinal and cystic irritation.

Louis met with uniform success, he tells us, in the employment of a quack remedy, Darbon's potion, a secret nostrum. It seems to have been as safe as it was powerful. In one instance, it was stated to have procured the expulsion of the heads of seven worms at one evacuation. Chomel, Lerminier and Fouquier, are said to attest these facts. A recent writer suggests, that this nostrum may possibly consist of some preparation of the root of the pomegranate, a remedy which has long enjoyed a great reputation in the treatment of tænia. A pretty strong decoction is made of the dried bark of the root, of which an ounce or two ounces are given every half hour, until there are nausea, giddiness, and pain in the bowels, which symptoms are almost always shortly followed by the expulsion of the worm. It seems to act specifically, of which it is regarded as proof, that a living tænia, plunged into such a decoction, writhes, suffers much, and dies soon. Elliotson, who thinks highly of the bark of the pomegranate root, prefers the powder to the decoction. Some advise it to be followed by a purgative, within a few hours, and that no food should be taken in the mean time.

The male fern, *polypodium filix mas*, has also been much extolled. This is the basis of the Swiss remedy, purchased by the French Government, from Madame Nouffer. While some rely confidently on this medicine, others speak of it with contempt. Cullen regards its good effects as depending entirely on the drastic cathartics with which it is combined. It is of little consequence to decide this point, but I cannot help thinking the evidence preponderates in favor of its specific vermifuge power. Three drachms of the root reduced to a fine powder, form a dose for an adult, to be taken in any simple water. Two hours afterwards, a bolus is to be administered, consisting of calomel and scammony, each grs. xii, gamboge grs. v. If the purgative do not operate sufficiently, some neutral salt must also be taken, at a proper interval.

Prof. Christison has recently been employing an extract obtained by ether from the root of the male shield fern, Mad. Nouffer's old remedy. It has been tried in upwards of 20 cases by himself and others, and in no instance did it fail to discharge the worm, commonly in one mass. Its operation was not attended with pain. The dose was from 18 to 24 grains, which latter killed the worm with greater certainty.

Odier prefers to all other cathartics here, the simple castor oil, which he used with this view, perseveringly and in large quantities.

Rosenstein expelled tape-worms, he tells us, by mere purging; during the operation, causing his patients to drink profusely of cold water, which he supposed rendered it liable to be detruded by the peristaltic action of the intestines. The water should be very cold or even iced. He urges the taking of a glass every four or five minutes, until a gallon has been swallowed.

Some of the mechanical remedies are said to have succeeded well, of which the filings of tin and the cowhage are examples. Dr. Parr affirms, that he has witnessed the most happy effects from the administration of the coarse raspings of a pewter plate. The amalgam of tin with quicksilver, by whom suggested, or with what view originally, I know not, has been highly spoken of by certain writers, among them the justly celebrated Darwin. An interesting example of the results of its incautious employment, for the expulsion of tape-worm, may be found in the *Phil. Journ.*, vols. i. and ii. The patient took of this amalgam not less, it would appear, than twenty ounces, which, failing to pass off by stool, remained massed together, and impacted in the intestinal tube during the remainder of his life, occasioning, as may be supposed, many and severe inconveniences.

Kousso, or Kwosso, is a new remedy lately introduced from the East. It is the flower of an Abyssinian tree, the *Brayeria anthelmintica*, and comes to us as a brownish powder, of which the dose is ʒivss, to be taken in the morning fasting, in three-fourths of a pint of hot water, infused for ten minutes, stirred, and the whole drank off. It sometimes nauseates, sometimes purges; but seldom fails to destroy and discharge the worm. Dr. Budd gives a Seidlitz powder or a dose of castor oil after it. The worm seems promptly killed by it.

An equally effectual and much more convenient and cheap antidote is *pumpkin-seed*, first used by Mongeney. He made a paste of it by mixing up 90 grammes (1350 grains) of the fresh seed, skinned, and beaten with honey. This dose, without producing any unpleasant effect, dislodges the worm in about seven hours.

Prof. Patterson prefers the *oil* of pumpkin-seed in the dose of ℥j followed by a dose of castor oil. An orgeat has been made as follows: "℞.—Best West Indian pumpkin-seed, shelled and pounded in a mortar, two ounces, with half a pint of water: strain and drink in the morning, fasting; after which drink as much cold water as you can. If it does not operate in an hour and a half, take a dose of castor oil. Undried acorn or marrow squash-seed will do as well." (*Med. Examiner*,)

The Rottlera Tinctoria, a recent East Indian remedy, has been highly eulogized. I have no experience with it.

DISEASES OF THE COLLATITIOUS VISCERA.

Hepatitis.—Of the organs contributory to the function of digestion, the liver is the largest. Indeed, it is the largest of the human viscera; its ordinary weight, in a healthy adult, being calculated at about three pounds. It would also seem to be among the most important, whether we argue from its size, its almost invariable presence in the different classes of animated beings, or the large supply and singular distribution of blood sent to it.

Of the immediate agency of the liver, or the particular uses of the bile, which it secretes in so large a quantity, in the process of digestion, there is still some uncertainty. It eliminates carbon and hydrogen. It produces sugar. But we cannot hesitate to accord to it a principal place, in a pathological point of view, when we reflect upon the extent of its sympathetic connections with the various parts of the system, and the influence of its diversified morbid conditions, upon both the mind and body. In warm climates, especially, this influence is more striking and clearly marked, and in miasmatic regions of country there are few instances of disorder, either of the circulatory or digestive functions, in which the liver is not primarily or secondarily affected, in a greater or less degree. Numerous exemplifications of this fact have crossed us at every step of our progress, as in bilious fevers, dyspepsia, dysentery, etc.

Whatever form of hepatic disease may be generated by whatever cause, it will be apt to give rise to, or run into, an inflammatory condition of the liver, and the inflammation may be either of the acute or chronic character.

The distinction between these two species of hepatitis, does not simply refer to the time occupied in their course, or the rapidity of their progress, but is generally understood to imply a difference in kind, as well as in degree. Thus many believe acute hepatitis to consist in an inflammatory state of the membranous envelop of the organ; and chronic, in inflammation of its parenchyma. Others attribute the acute species to an inflammatory condition of the ramifications of the hepatic artery; and the chronic, to a like state of the vena portæ.

I am disposed to think there is reason for the first of these distinctions. The pain in acute hepatitis is often extremely severe, and much unlike the deep-seated aching connected with inflammation of parenchymatous structures generally. Yet, neither can I doubt that they, at times, run into and produce each other; the acute leaving often behind it the chronic inflammation; and the chronic needing, in many instances, only the application of some exciting cause to become acute also. Here it is evident, that both the internal structure and the external surface or membranous coat, must be affected at the same time. "When in disease of the liver," says Baillie, "inflammation is confined to the membrane of the liver, it is not frequently extended over the whole of it, but more commonly takes place in that portion of it which covers the anterior or convex part. I have also seen inflammation or its effects, on that side of the liver which is in contact with the stomach and the duodenum. When the membrane is inflamed, the substance is sometimes inflamed which lies immediately under it."

Acute hepatitis commences with rigors, and an accelerated, hard, jerking pulse; there is a pungent pain in the right side, which is felt under the margin of the ribs, shooting to the back and to the top of the shoulder. The pain is permanent, usually without sickness at the stomach, but occasionally, if extremely severe, attended with nausea. The tongue is whitish and furred, and the skin hot and dry, and there is much thirst; the bowels are irregular, but for the most part costive. The respiration is hurried and uneasy, and a deep inspiration increases the pain in the side. Cough comes on, short and dry, some hours after the access of the disease.

We have a case related with great candor by Cleghorn, which he imagined to be pleurisy; the patient died on the twelfth day, and on examination there was found a large abscess in his liver, his lungs and pleura being quite sound. The diagnosis, however, is not usually difficult. We have, in hepatitis, the pain at the top of the right shoulder, a symptom difficult to account for. Much insisted on by writers generally in hot climates, its frequency and importance are both denied by McIntosh, Andral, and Stokes. I have always met with it. There is, at first, no cough, which comes on in pleurisy simultaneously with the pain and fever. The patient complains of pain lower down in his side, placing his hand, when desired to point out the seat of his sufferings, upon the cartilages of the false ribs, and when the hand is pressed pretty firmly inwards and upwards under the ribs, he shrinks and starts back. Exploration of the thorax and abdomen, carefully made, will obviate any farther liability to mistake. If the lungs be unaffected with inflammation, resonance on percussion will be unimpaired, and the respiratory murmur will be distinguished. Allowance must be made, however, for some projection upward, of an inflamed and swollen liver, which will encroach somewhat on the usual limits of the thoracic cavity, by pressing up the diaphragm.

Heat, though the principal predisposing cause of acute hepatitis, and capable in itself of generating it, as it would appear, is not yet the only source of the disease. It is liable to be brought on by the application of other agents or excitants; among them, the chief may be considered alternations of temperature. "Cold," says Mosely, "is the cause of almost all the diseases in hot climates, to which climate alone is necessary." The application of even a slight degree of cold is affirmed by Johnson, to be pregnant with danger, in the debilitated state of the extreme vessels of the skin and liver, consequent upon the continuance of heat for some time. "For not only is the animal heat too rapidly abstracted, but both these sets of vessels are instantly struck torpid; the biliary secretion and perspiration are both arrested; the passage of the blood through the liver is obstructed, and congestion and inflammation are the results." Any excess, either in eating or drinking, indulgence of any of the passions, exposure to rain or moisture, night dews, etc., have all been known to bring on attacks of this form of disease.

Acute hepatitis may terminate in various ways; either prostrating the patient like other inflammatory diseases, and running at once to a fatal issue; or giving rise to a chronic affection of the organ; or ending, under favorable circumstances of habit and constitution, and skilful, energetic treatment, in resolution more or less complete. It occasionally produces suppuration, when one or more large abscesses will be found in the organ. The secretion of pus in the liver is known by chills and rigors taking place, with a sense of weight and heaviness in that part of the abdomen. Sweats about the face, with increased frequency of pulse, are also enumerated by Pemberton among the tokens of the occurrence of suppuration. This is always an alarming circumstance, though not necessarily fatal. Annesly, in the East Indies, has met with several examples of cicatrization of the liver, after "cured hepatic abscess." One such case occurred in the Meath Hospital, in a soldier formerly serving in Hindostan: the cicatrix, described by Stokes, consisting of a depression, with puckering of the hepatic tissue and deposition of cartilaginous structure. If adhesions have preceded the suppuration, the pus may point outwardly, and the abscess open on the side, in which case the patient may ultimately recover. Adhesions have connected the diaphragm with the upper surface of the liver, and the lungs with the diaphragm: and ulceration taking place, the matter has found its way into the lungs, and been spit and coughed up in large quantities. By similar adhesions it has made a passage into the stomach or intestines, and been discharged by vomiting and purging.

Pemberton mentions his having seen a large abscess in the liver capable of containing at least two quarts, which, by a very gentle pressure, could be made to ooze through the diaphragm by innumerable small orifices, into the lungs, which were adherent. In the matter of the abscess, he informs us, were great numbers of hydatids, from the size of a pin's head to two inches and a half in diameter. Hydatids, by the way, are found in the liver, as frequently, perhaps, as in any other part of the human body. A case is related by Thomas, in which sixteen pints of fluid were drawn off from a tumor in the region of the liver, probably a very large hydatid.

The *treatment* of acute hepatitis requires nothing peculiar in principle, but must be directed by the rules before given for our government, in all active inflammations of internal organs. Our most important remedy is, in the first place, venesection, and this must be carried to the fullest extent compatible with the strength of our patient, until we have relieved the pain, or brought down the force and frequency of the pulse; and if the circulation appears excited again, in an hour or longer period, bleed again to the same result, and repeat the operation as often as the same circumstances may demand it. Local abstraction of blood by leeches and cups, is here of great importance, and should without delay be had recourse to. Active purging is our next reliance. Calomel, so much recommended by some, does not seem to me adapted to the case. I prefer, infinitely, the neutral salts, which tend much more clearly to the rapid diminution of the inflammatory excitement. I may observe here, and would wish particular attention to the remark, that in the inflammation of parenchymatous structures and of the mucous membranes, mercury is unrivalled in its beneficial influence; while upon inflammation of the serous membranes, as of the peritoneum, pleura (dura mater), etc., it has comparatively little remedial effect, unless when the affection is of a chronic form. In the case under consideration, our safer dependence will be upon the free administration of the neutral salts, as sal Epsom, combining perhaps some antimonial, which will slightly nauseate and determine to the skin; or an active cathartic, as the compound powder of jalap and sulph. potass, may be prescribed with similar addition. Local bloodletting may be still employed from time to time; cups or leeches being applied and reapplied, followed by assiduous fomentations until the vascular excitement, local and general, has been sufficiently reduced, when a large blister should be put on the part in pain, which may either be kept running, or renewed as often as necessary. These impressive measures being entered on with sufficient promptness, and carried into energetic execution, the disease will rarely fail to yield at once. Indeed, I have never seen a fatal case of the kind. When the nature of the attack has been mistaken or imperfectly understood, the patient not seen till the morbid action was too well established to be subdued, or the case improperly managed, we must expect it to issue in one of the unfavorable terminations formerly enumerated, the rapid prostration and exhaustion of the patient, the supervention of the suppurative process, or the establishment of inflammatory action of an obstinate, low and chronic form.

If suppuration has distinctly come on with great reduction of the pulse and general prostration, the patient's strength must be supported by a nourishing diet and tonics, of which cinchona is to be preferred. If any tumor should appear upon the side, about or under the ribs, it should be opened, and a free vent given to the matter, which being thus evacuated externally, and the patient properly supported, offers us hope of his restoration to a certain degree of health. Graves has proposed, ingeniously enough, to invite the matter contained in a hepatic abscess to the surface, by the following operation: Having ascertained the condition of the liver by careful examination, he lays open, by a free incision over the tumor, the various tissues that form the abdominal parietes down to the peritoneum, preventing the union of the incised parts. The pressure being thus removed, the pus within projects the walls of the abscess at the uncovered spot, and escapes readily through a puncture made there. An incidental, but important advantage is supposed to be gained here, by the occurrence of adhesive inflammation, which unites the external investing membrane of the liver to the opposite surface of the peritoneum, thus preventing the admission of the matter into the abdominal cavity when the abscess is opened. An attempt is recorded, to substitute caustic for the knife, in a case of this sort. It was a failure; the pus getting into the abdomen, brought on peritoneal inflammation, of which the patient died. Haspel, who saw in Algeria much hepatic abscess, advises early opening, and prefers the application of the caustic to all other modes, including Graves', just described. He applied it himself in 11 cases, without any unpleasant result.

Chronic hepatitis, as being of much more frequent occurrence in our climate, than the acute species, claims from us particular attention. Indeed, it is scarcely possible that any of the numerous agents which, especially in hot climates, affect the liver, should not produce, in a greater or less degree, the sort of morbid condition intended to be described under the above title; for, whether torpor or exhaustion, or venous congestion, or arterial or secretory obstruction be the primary consequence of the application of the various causes of hepatic disease formerly noticed, inflammation, in some shape, must be the almost necessary result of the irritation thus produced.

Chronic hepatitis is, for the most part, developed slowly, and the symptoms which denote its presence are at first obscure. There is a sense of weight and fulness, with a dull pain in the right side, yet so slight that no notice would be taken of them, if inquiry were not made. On pressing with the fingers upwards and inwards, the patient will usually shrink, and the edge of the liver will be felt thicker and heavier than natural. In instituting this examination, we direct the patient to make a strong inspiration, so as to force it down as far as possible by depressing the diaphragm. "When the liver becomes enlarged," says Bell, "its hard margin comes down, so as to be felt through the abdominal parietes under the ribs. This enlargement of the liver, and consequent descent of its margin, is to be felt more easily by grasping the integuments of the belly, as if you expected to lift up the acute edge of the liver, than by pressing with the point of the finger. By this means we shall be sensible of the elasticity and softness below the liver, and of the resistance and firmness of its margin. The physician, however, should not forget," he goes on to observe, "that the depression of the diaphragm, and the consequent protrusion of the liver by disease in the thorax, may give the feeling of enlargement and hardening in that organ." There are generally pain and uneasiness, too, at the top of the right shoulder. I have seen cases of hepatitis marked with sufficient distinctness, in which the pain was in the left side, and the top of the left shoulder. In these, the left lobe of the liver was probably the seat of disease. "The left great division of the liver," says the writer just now quoted, "is, perhaps, as often diseased and enlarged as the right, in which case it is more difficult to ascertain it by examination." The appetite and strength are diminished, the spirits are dejected, there is emaciation more or less perceptible. The tongue is usually whitish, there is some thirst, the sleep is harassed and disturbed with disagreeable dreams. The bowels are irregular, sometimes rather costive, but most frequently loose, with ill-conditioned passages, showing a deficiency or vitiation of the bile; and this state of the intestines has obtained the specific appellation of hepatic diarrhœa. It is, indeed, of no little importance to observe the qualities of the alvine evacuations, and to note the various changes in the appearance of the bile mingled with them. These appearances are exceedingly diversified, from a thick molasses or tar-like color and consistence, to yellow, bright, and healthy bile, the discharge of which is, perhaps, the most favorable token of the restoration of healthy hepatic action. A scalding sensation in the bowels and at the anus, marks generally the evacuation of bile highly vitiated. The pulse is quickened, and somewhat tense and corded, though contracted and small. There is a sallowness of the countenance, a yellowish tinge of the adnata of the eye, and the face seems somewhat tumid. There is a febrile exacerbation every evening, and an increase of a dry tickling cough, which usually attends. The patient lies most comfortably upon the side affected. In the progress of the case, the feet and angles are swollen, and the strength of the patient is more and more rapidly sunk by the continuance or increase of a chronic looseness or diarrhœa. Those err who anticipate jaundice as among the ordinary results of hepatic inflammation, whether acute or chronic. It is more apt, indeed, to follow a duodenitis, than a hepatitis, for a very obvious reason. The former has much more the direct tendency to induce swelling and closure of the duct, and thus prevent the passage or elimination of the secreted bile.

Among the variety of causes enumerated by authors, as producing the disease, are excess in the pleasures of the table, and in the use of alcoholic liquors, and in the indulgence of the various passions; exposures to atmospheric vicissitudes, moisture in its several modes of application, fatigue, &c. It has been affirmed to have followed as the consequence of obstinate quartans, having been affected in lieu of the spleen, the usual seat of intestinal congestion and inflammation from this class of agencies. I have seen it developed in three young females, without the application of any evident or prominent exciting cause; a strong predisposition to hepatic disease was, however, in one of them, hereditarily derived.

Chronic hepatitis is more likely to run into suppuration than acute, as affecting already the internal structure of the liver. I have myself seen, in a long-standing case, the whole viscus converted into an immense abscess, a seeming bag, containing pus, the sides of which were diminished by absorption, to the thickness of half an inch. These

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surface. For these purposes I am accustomed to prescribe calomel in small doses, in combination with pulv. antimon., adding jalap or pulv. rhei in sufficient quantity to affect the bowels moderately. This plan will, however, require to be persevered in, as no immediate beneficial results are to be expected from it. "The mouth," says Pemberton, "should be kept in this state of gentle salivation, till all symptoms of the disease disappear; and the practitioner must therefore modify the quantities of mercury to be used, by the effect produced." Next in efficacy to mercury, we rank the mineral acids, which may often, indeed, be successfully employed as substitutes for mercury, when any circumstance contraindicates its use. After a great deal of discussion upon the subject, it seems now to be agreed on, that the nitro-muriatic acid, formed by mixing equal parts of nitrous and muriatic acids, deserves a preference. I have, however, been much pleased with the use of the nitric alone; the muriatic unmixed is said to be less applicable. The nitro-muriatic acid may be administered internally in the dose of from 3 to 10 drops, three or four times a day in any pleasant vehicle; some mucilaginous syrup is generally employed. The nitric may be given in the same manner. Care should be taken in prescribing these strong acids, to preserve the teeth from injury or corrosion; the patient should, therefore, be advised to wash the mouth completely after each dose, or as some recommend, to suck up the fluid through a cane or glass tube, or pour it down the throat from the spout of a proper vessel, introduced far into the mouth. Nor is the external application of the acids wanting in power or effect. The facts tending to the proof of their efficacy, when used in this way, are numerous and strong, and are triumphantly recorded by Dr. J. Johnson, as confirming his theory of the close and direct sympathy between the skin and the liver.

The feet and legs of the patient are to be immersed in the warm nitro-muriatic acid bath, from twenty minutes to half an hour, just before going to bed, every night or every second night. It should cause a pricking sensation, and a warm, perspirable state of the feet and legs of the patient. The effects attributed to the use of the acid, either internally or as a bath, are said much to resemble those of mercury, in exciting the secretions and the excretions. It induces very considerable perspiration, and sometimes augments very suddenly and remarkably the secretion and flow of bile, and occasions in some persons faintness, and an increased flow of saliva. Internally, I have often prescribed the acid, and with much satisfaction. Taraxacum, the tomato, and various compounds of aloes, scammony, colocynth, and other drastics have been urged upon us, and highly eulogized as substitutes for mercury. I am not willing absolutely to deny them any efficacy, but whatever benefit may be occasionally derived from their use, it is not such, by any means, as to enable us to dispense with our most invaluable alterative. Iodine, in several forms of preparation, has been recently employed in the treatment of obstinate chronic hepatic affections. I cannot speak very confidently of its effects when uncombined, yet I think I have derived advantage from it in very minute doses, as in the diffuse solution of Lugol, one grain to two pounds of water, persevered in for a considerable period of time. As similarly diffused in many mineral waters, the White Sulphur Springs of Virginia, for example, it has gained, and justly, I think, a high reputation. I am disposed, too, to place much reliance upon the exhibition of the deutiodide of mercury and potassium in these tediously protracted cases, and am now much in the habit of resorting to it, after the preliminary measures necessary for subduing general and local excitement have been duly carried into effect.

While pursuing the means above detailed, we should not neglect the topical remedies applicable to the case. If there is much pain, we may, in addition to the moderate venesection directed above, or when this mode of general depletion is inadmissible, detract blood locally from time to time, by leeches or cups applied to the side; after which, a large blister should be put on, and a succession of them made use of, in preference to keeping open the vesicated surface by other stimulating dressings. If the tumor should press outwards, apply fomentations and poultices to relieve pain, relax tension, and solicit the pointing of internal abscess. When fluctuation is perceived, open with as little delay as possible. I have twice punctured a large abscess in the same patient, at long intervals. I would follow Graves' caution, if there did not seem to be adhesion at the point. Flannel should be worn next the skin, for the purpose of promoting free perspiration, restoring, in some measure, the regular balance of excitement, and preventing the evil influence of atmospherical vicissitudes, which are among the agents most prejudicial to the sufferer in chronic hepatitis, and which must, therefore, be carefully avoided by every means in our power. Exercise in the open air will form an essential part of the regimen to be observed, when the weather is warm, equable, and favorable, and the patient's strength and circumstances, as to pain, etc., will admit of it; when otherwise, the swing is an excellent substitute.

Rigid temperance must be strictly enforced. The food must be of the plainest kind, and prepared in the least stimulating manner. Rice, with boiled meats, as poultry, mutton, etc., will constitute the utmost limits of indulgence in the pleasures of the table. No distilled or fermented drinks are to be allowed; water, however insipid and disgusting it may seem to a palate and stomach long accustomed to the fictitious excitement of wines and ardent spirits, must constitute the chief beverage. The moderate use of tea and coffee is all else that can be permitted.

Chronic hepatitis becomes connected with, and, indeed, gives rise to dyspepsia and other modes of morbid action of the digestive organs. In such cases, a resort to some mineral spring will be of much service. The gently purgative waters are to be preferred; indeed, continued mild purging, of itself, seems often adequate to the removal of the lighter forms of the disease now under discussion.

I have mentioned the singularly deep depression of spirits so invariably the result of an improper and diseased performance of the hepatic functions. This, too, is best relieved by the society, amusements and bustle of a fashionable watering place, and some have even doubted whether these are not quite sufficient to account for the recoveries which occur at such resorts, without the supposition of any curative property inherent in the fountains themselves. Be this as it may, a residence at such places is among our most successful remedies in the case before us.

In obstinate chronic hepatitis, however, we should not fail to recommend, if within the reach of our patient's means, a sea voyage, and change of climate. These are not only useful, by their own remedial influence, but they seem often to be necessary, in order to renew the susceptibility of the system to the effect of our medicines. Attention must be paid to the kind of change which we advise; thus, we should not send a patient from a warm climate to a cold one in winter, where he will be sure to sink under the chilling effect of sudden decrease of temperature, or will be rendered liable to an attack of acute, supervening upon his chronic state of inflammation of the liver. Nor, on the other hand, would we permit him to venture into a more southern region, during the heats of summer or autumn, there to encounter, in increased intensity, the same causes which had previously exerted, on his hepatic system, so injurious an influence.

The Liver is subject to *hypertrophy*, and atrophy. Good tells us it has reached the immense weight of twenty-eight pounds; its average being between three and four. It has been atrophied down to the bulk of the kidney. A form of hepatic *atrophy* is known under the title of *Cirrhosis*, and commonly called "nutmeg" or "hob-nail liver." The organ, which is somewhat contracted in bulk, and firmer and harder than natural, externally looks like a membranous bag of small rounded bodies, nail-heads, marbles, nutmegs, or the like; when cut into, it is found to contain innumerable capsules of various bulk, and of *deep yellow hue*, whence its name. Some contend that it is "a hypertrophy of the capsule of Glisson;" others that it "depends on partial congestion of the lobules." Its existence cannot be known during life, unless the surface of the liver can be distinctly felt by the hand, when its rough unevenness denotes the nature of the case. It is apt to be connected with jaundice, but not uniformly; always, so far as I have met with it, associated with ascites. In every instance but one, my patients were intemperate; that one was in remarkable contrast, being a delicate and most irreproachable young lady. It is not, I think, often seen in our country. Prof. Webb, of Calcutta, affirms it to be common in India, "as well as another form of cellular degeneration, in which the liver is converted into a mere sponge-like mass, consisting chiefly of Glisson's capsule, without a trace of granular structure." A softening of this capsule also occurs, "in which it can sometimes be dissolved or washed away by a stream of water—a cachectic hypertrophy." (*London Med. Gaz.*, July, 1849.) All these are objects of pathological interest chiefly. They appear unconnected with inflammation, and are not, so far as I know, cognizable by the practitioner, or amenable to treatment.

A fatty enlargement of the liver is more common, perhaps, than any other form of hypertrophy. It is analogous to the state in which the liver of the goose is found in the "paté de foie gras of Strasbourg."

It may in many cases be ascribed to causes analogous with those which are applied to produce that luxury, gluttony, high temperature, a sedentary life. It occurs very frequently in the latter stages of phthisis, and perhaps of some other diseases, as a vice of nutrition in part, and partly as the result of the failure of the organ to excrete the hydrocarbonous elements brought to it by the veins of the portal system. Bache tells us that it was found in the yellow fever livers, in Philadelphia, in 1853. As I have stated in speaking of yellow fever, we have frequently the "fawn-colored," "gingerbread," "café au lait" liver, but it is not apparently hypertrophied; it is light, small, and its paleness suggests the idea rather of an anemic, than of a fatty condition, in most instances.

The liver becomes indurated not very seldom in hot climates. We use to express this hardening, but improperly, the term scirrhus, which suggests a cancerous relation. It seems to consist in a mere deposition internally, of plastic matter, remaining solid and unchanged. Cancer, however, does occasionally attack the organ. Tubercles are often found deposited within its substance; so, as already stated, are hydatids.

The most frequent, however, of hepatic affections known in our climate is icterus.

ICTERUS.—The present subject affords us a very striking instance of the conventional application of a nosological term without definite significance. In using the word jaundice, physicians seem to mean nothing but an allusion to an unnatural color of the skin, which, in a vague way, and doubtless originally from mere analogy of hue, they refer to a suffusion of the integuments with bile.

This sallow hue, universally regarded as characteristic of this disease, is indeed the only constant symptom of jaundice. Coincident with it, for the most part, we have anorexia or impaired appetite, loss of muscular strength, diminution of all the energies of the system, physical and mental, dejection of spirits, constipation, and absence of the natural brown tint of the alvine discharges. The tongue is usually coated with yellow mucous saburra, and a bitter taste is perceived in the mouth; there may be nausea and occasional vomiting, especially in the mornings. In some instances, a fulness, weight, or pain, is felt in the right hypochondrium; the lower extremities become œdematous, and anasarca or ascites gradually supervenes.

Less frequently the patient is attacked, in addition to these symptoms, or perhaps first in the train, with violent pain in the epigastrium or in the right side—dyspnœa—retching and vomiting, great anxiety, extreme oppression, with a sense of swelling, and, indeed, with actual intumescence of the abdomen, which quickly becomes intolerant of the lightest pressure. The bowels are acted on slowly and with difficulty, and stools, when procured, are clay colored or quite pale; perhaps, on careful examination, we may find small concretions, "biliary calculi," voided with them.

I have said, that the discoloration of the skin is the only constant symptom of the icteric state. The skin, and the adnata of the eye, are of a deep orange yellow; the urine is high colored, giving a yellow tinge to paper or white cloth dipped in it; the perspiration sometimes discolors the linen. "Milk alone," says Heberden, "of all the secretions, is not thus changed in jaundice." Marsh, however, tells us of a case, in which "the breasts were full of a yellow fluid, possessing the properties of bile;" and Eberle says, that he tasted bitter milk from the breast of a jaundiced patient.

Poets and philosophers have, in all ages, made frequent allusion to the fact, that the jaundiced eye sees all objects colored with its own sickly hue, from the peculiar suffusion of its humors. It has never happened to me to meet with an instance in which this affection of vision was alleged to occur, although I have not failed to inquire concerning it of all the subjects of the disease under my care. McIntosh, however, asserts that he has "known several individuals who saw every object discolored," and speaks of one in whom this was "the first circumstance that excited attention." Good affirms that the phenomenon actually took place in his own person. Be this as it may, I am, with Gregory, disposed to doubt the often repeated statement, that all the solids, as well as the skin, are thus stained—at any rate, I have not met with any examples of it.

The discoloration of jaundice is spoken of habitually as yellow, and such it is, indeed, in an infinite majority of cases. But in times long past, icterus was divided into species, in reference to the variety of discoloration presented, whether of the bile discharged, the mucous secretions, or the general surface. Thus, three forms of jaundice can be recognized—the *yellow*, the *green*, and the *black;* and these distinctions are not left to rest upon tradition merely, or ancient authority. Baillie recognizes and describes the two first. Good retains the division, and acquiesces in its correctness and propriety. Marcard, of Hanover, regards the distinctions thus offered as truly specific and characteristic, not dependent on intensity alone, as has been imagined.

In the month of August, 1825, I chanced to meet with a strongly marked example of *icterus viridis*, in a negro patient, who was attacked while apparently convalescing, though slowly, from smallpox. Of course no change in the hue of the skin was here perceptible, but the conjunctiva was strikingly green, with a slight tinge of yellow; the tongue and the mucous lining membrane of the mouth were greenish, and the saliva, and bronchial mucus which she coughed, hawked, and spit up, were perfectly green—deeply grass green. Her alvine evacuations were also of a deep dark green.

That there is, as has been contended, something peculiar and specific in these cases, is rendered probable by the fact that icterus viridis almost always ends fatally, while the prognosis in the ordinary form, known as yellow jaundice, is very generally favorable, making due allowance for the causes which brought it on, and the constitution of the subject affected. Baillie saw but two recoveries from icterus viridis; Good and others represent it as almost uniformly fatal. It seemed disposed, in a majority, to protract itself indefinitely, proving slow and chronic, and enduring for years, perhaps. My patient died in about a month from the commencement of the attack, worn out with atrophy, and miserably emaciated.

Jaundice has been divided under the heads of idiopathic and symptomatic; but the distinction is not capable of being observed with definite clearness. So many causes, indeed, have been assigned for the phenomena which are brought together under the general term icterus, that it will not be found easy to connect or classify them.

(1.) Every obstetrician and nurse is familiar with the "yellow gum" or jaundice of the new-born infant. This is attributed, with much plausibility, to the greater promptness with which the absorbents commence the exercise of their office than the emulgent vessels begin theirs; or the bowels take on their peristaltic movement to discharge their contents. Some ascribe it to the mechanical obstruction of thick mucus impacted in the duodenum at the mouth of the ductus communis choledochus, preventing the passage of bile into the intestines. It is an affection attended with no serious consequences, and for the most part easily removed. A single mild cathartic puts an end to it at once, or it subsides of its own accord within a few days.

Similar to this probably, both in nature and cause, is the attack which we sometimes meet with in adults, betrayed by no sign but a transitory sallowness of visage; the health of the individual being so little deranged that, but for the remarks of his friends, or the information caught from his mirror, he would not know that anything was the matter with him.

(2.) Jaundice—as the consequence of mental emotion—is not at all uncommon. Fear has been often known to produce it suddenly; the sallow complexion is almost as certain and well-known an effect of long-continued care and anxiety, as the haggard expression of the countenance; but grief seems, of all the passions, most adapted to occasion it. The ancients ascribed to jealousy a peculiar influence opon the liver. "Uror," says Horace, "meum fervens difficili bile tumet jecur." In such cases as these, pathologists have supposed the direct impressions made upon the brain to be promptly, though sympathetically, communicated to the liver, whose functions become soon deranged, and icterus thus results. The whole train of evil may perhaps be more rationally ascribed to an intermediate disturbance of the stomach, the shock to the digestive apparatus so readily diffused by means of the ganglionic nervous system to all the abdominal viscera, whenever the mind suffers in any manner.

(3.) Icterus is the concomitant or sequela of several other maladies. It connects itself with a very large proportion of the autumnal diseases of hot climates. The tawny darkening of the complexion, not only in the yellow fever of tropical regions, and the ordinary remittents and intermittents, but in the various races of men, has been ascribed to it. It rarely complicates typhous fever, but I have seen this occur. In my own case, a transient but oppressive attack of jaundice followed a few hours' intense sea sickness, occasioned by a rough sea, in crossing the British Channel, from Dover to Calais. We now and then meet with it during convalescence from sporadic cholera, especially in summer and autumn.

(4.) Nothing is more commonly acquiesced in than the belief that the malaria of miasmatic districts, acting readily upon the skin and liver, is exceedingly apt to produce icterus; but it has not been so distinctly noted as it deserved to be, that, as I remarked above, the malaria of certain years is distinguished by some undefined modification, which very strikingly increases this tendency. Cleghorn, in his *Observations upon the Diseases of Minorca*, mentions a "common distemper in July and August of the year 1746, a slight jaundice without a fever, which soon yielded to purgatives and saponaceous medicinès." A similar prevalence of jaundice has been repeatedly observed in different localities, entitling it to be regarded as a local and transient epidemic.

(5.) In many individuals examined after death, the gall-bladder is found occupied by concretions of various form, size, and chemical composition. It happens that such concretions are occasionally voided in icteric stools. This may take place without inconvenience or suffering, and the excretion of such bodies may seem of no consequence whatever; but in general, about, or a little before the time of the passage of a gall-stone, the subject of such accident labors under certain definite symptoms, of which jaundice belongs to the usual train. The inference is easy and not illogical. We suppose that, in cases of this sort, the following history is applicable: A gall-stone or biliary calculus, however unfelt or inert it may be in the gall-bladder, if by any agency it is thence expelled and forced to travel onwards through the duct, towards the duodenum, finds more or less difficulty in its progress; its size or form, often angular, prevents its easy transmission; its presence at every step of its passage gives more or less pain and irritation, obstructing, meanwhile, the regular and necessary flow of bile through its usual channel, into the primæ viæ. Hence we have discoloration of the surface, from its absorption into and diffusion throughout the mass of blood, and hence the other symptoms, whatever they may be, which result from default of mixture of bile with the other contents of the alimentary canal, and those which flow by radiation or sympathetic communication from the irritative excitement mechanically created by the position of the calculus.

(6.) It sometimes happens that all these symptoms show themselves concurrently, in a given case, without our being able to detect, on the most careful and unremitting inspection, any biliary concretions in the alvine discharges. Yet we have every proof of obstruction to the passage of bile, of its resorption and diffusion, pain in the very region affected by pain when a gall-stone is passing, and all the sympathetic irritation aroused by its progress through the ducts. Here we cannot but infer the closure of the ducts; but the question arises as to the mode of occlusion. From the suddenness with which the attack comes on, from the equal suddenness of the relief obtained sometimes, and from the nature of the remedies most generally successful, a topic which we shall discuss in its proper place, it is inferred that the duct may be, and is affected with spasm. Such, indeed, seems to be very probably the fact, in certain instances. But I am disposed to agree with those who regard such attacks as not unfrequently inflammatory in their nature, and refer their origin to an obscure duodenitis, which has given rise to a continuous inflammation extending into the ductus communis choledochus, and perhaps the smaller branches of the same excreting canal; the thickened condition and irritable state of whose internal membrane may well account for all the phenomena. Nay, it does not seem to me unreasonable to believe that inflammation of the mucous tissue of the duodenum alone might, by its swelling and pressure upon the orifice of the duct, produce all the results in question.

(7.) Finally, I must not omit to allude to that form of icterus, occasioned, as writers allege, by the presence of abdominal tumors within the abdomen, enlargement and scirrhus of the pancreas, etc., lying in contact with, and forcing together the sides of the hepatic and common ducts.

That icterus is often a simple derangement of function appears from the fact that *post-mortem* examinations so frequently betray no lesion whatever, and, indeed, some of its forms supervene and subside too readily, and with too much seeming spontaneity, to allow of any structural changes being connected with them. It is a chronic disease, and generally unattended with fever. The discoloration of the skin is not usually associated with any irritation, but some patients complain of itching, particularly at night.

The consequences of jaundice are more apt to be serious and troublesome than we are led to apprehend from the want of violence in its course; or, rather, it is, not unfrequently, as I am disposed to believe, one merely in a train of evils resulting from some obscure defect or impairment of constitution of the patient. Thus, we see it followed by dropsy, by chronic diarrhœa, by a species of atrophy, and as some writers say, by cerebral affections, among which apoplexy is enumerated. I cannot consider these as properly the sequelæ of jaundice, but rather as the coincident or successive effects of some common cause which has produced them all. The modifications of icterus most to be dreaded are, that which is connected with the passage of a gall-stone, and that which is attended by the same symptoms, though without our being able to find any concretion, and usually spoken of as spasm of the duct. In both these I have been much struck with the liability of the patient to inflammation of the intestines—as cause, perhaps, in the latter, of all his sufferings; in the former, as consequence of the presence and passage of the calculus. In either case, it is well to be aware of the risk. Some of these attacks exhibit all the tokens of a gastro-duodenitis, of great severity and obstinacy, combined with the other elements of distress and injury. A more diffused enteritis sometimes supervenes, extending to the colon and rectum. The most extensive mortification of the intestine that I have ever seen was of this nature; more than two feet of the mucous coat of the lower bowel having become gangrenous.

The *treatment* of icterus must obviously depend very much upon the contingencies with which it is associated; the apparent or probable cause, the state of the constitution, and other circumstances of the patient. Referring to the divisions formerly instituted, I shall treat of these divisions separately:—

1. Infantile jaundice is, as I have said, attributable to the non-elimination of the bile in the new-born child, and its consequent diffusion

over the body, by admixture with the circulating fluids. Some suppose a mechanical obstruction to exist in the fulness of the duodenum, which they imagine to contain a sufficient quantity of thick mucus to press upon and close the oblique orifice of the ductus communis. Others take for granted a want of propulsive energy in the canal itself. Others, again, assume, in these cases, and in certain similar attacks suffered by adults, that the bile is in some manner imperfectly elaborated, and undergoes obstruction in the ducts, by an undue "viscidity," (McIntosh and Gregory,) a sort of inspissated condition, if I comprehend the language of the books, "its own viscosity" (Good). We have on record instances of immense accumulation of this thick concentrated bile in the gall-bladder, when the liver has gone on secreting and pouring it into this receptacle. Good tells us in one instance of its having amounted to eight pounds. It is even said to have given rise to fulness and engorgement of the organ itself, producing an obscure and dull variety of hepatitis.

The practice here is usually very simple, and readily successful. It is rarely necessary to do anything beyond the exhibition of a cathartic. For the infant a dose of castor oil is to be chosen; the adult will require an active purgative, such as calomel with rhubarb or jalap. If this fail, an emetic should be administered; and the antimonial is to be selected, unless there be present some contraindication to its use. It deserves this preference because of the more active succussion which it gives to the whole of the abdominal viscera, and the greater excitement which it communicates, through the stomach, to all the chylopoietic organs.

In obstinate cases, we must examine if there be any fulness of the right side, or pain aroused by pressure there. Leeching or cupping may be required, but for the most part there is evidence of torpor, rather than of irritation or inflammation. We should then direct frictions over the whole region of the liver, and the abdomen generally, with the hand, flannel, the flesh-brush, or the hair-glove. Fomentations should also be assiduously applied. Shocks of electricity across that part of the trunk are advised by Darwin, who ascribes to this agent a remarkably beneficial influence, in a case of supposed paralysis or torpidity of the bile ducts. Perhaps a gentle current of the galvanic fluid, kept passing for some time through the inactive viscus, would prove an efficacious excitant. Rough and harsh exercise, such as riding long distances on a rough trotting horse, has been found useful. Care must be taken, meanwhile, to keep the bowels regularly soluble by aloetics and mercurials in moderate doses, and at proper intervals. Saponaceous formulæ have been long in vogue here, with some obscure chemical purpose, and the common "turpentine soap" is affirmed to possess a specific energy and adaptation.

2. Jaundice from mental emotion requires very similar treatment to that detailed above. "Time, the great consoler," is, indeed, the best remedy here. Its soothing influence may be aided by the prudent use of the saponaceous and aloetic laxatives, combining with them small and distant doses of opium, or some one of the salts of morphine, and, above all, by advising a removal from every object likely to

awaken painful associations. In this especially, but indeed in all the forms of jaundice, a visit to some watering-place is apt to be very notably beneficial. The gently purgative springs are perhaps to be preferred; those which, as the Congress, &c., at Saratoga, contain a large and exhilarating proportion of carbonic acid gas, are most useful. Hot baths, too, do excellent service, by the centrifugal determination which they excite and keep up, thus relieving internal congestion and visceral engorgement.

3. Icterus, as a sequela from whatever mode of previous disease, is very likely to subside when convalescence has been perfectly established; yet this may be a very slow process, and may demand to be aided by some of the measures above indicated; horseback riding, if the patient is able to bear it, is among the best of these. Frictions upon the side, and the employment of galvanism or electricity, may be recommended.

4. Spontaneous icterus—the jaundice of hot climates and malarious districts—endemic and epidemic jaundice, as it has been styled, is not usually of a serious character, or difficult of cure. It disappears in many with change to a better air, or the return of cold weather, and is often dispersed by active exercise. If it protract itself, an emetic should be exhibited, or an efficient mercurial cathartic. Persevering efforts have been, and continue to be made, to discover some medicine, or combination of medicines, capable of acting on the liver as mercury is supposed to do—stimulating this gland to more abundant secretion, while it removes at the same time all obstructions, and enables it to disgorge the bile freely through its natural outlets. The ill consequences so often following the injudicious, mechanical, and extravagant administration of mercurials, have given great interest to this search after substitutes, and several have been proposed, drawn chiefly, though not exclusively, from the vegetable kingdom. Cook recommends to our special confidence a combination of aloes and rhubarb. Pemberton presses the claims of the taraxacum or dandelion, with little foundation, I fear, having often tried it altogether in vain; and of late, one of our western brethren, Dr. Bennet, of Chagrin, Ohio, maintains that the tomato, so much employed upon our tables as an acid sauce, possesses similar efficacy with calomel, being entirely free, at the same time, from any evil tendencies. An extract has been prepared, which is said to embody and concentrate its peculiar properties; but I have been unable to procure any definite results from its use. Bates urges the claims of podophylline as an alterative superior to mercury, as "exciting the great secretory organs, the liver especially."

As mineral substitutes, the muriates of gold and of barytes have been brought forward, but not received with any confidence. I mention with far more approval the nitro-muriatic acid, so highly eulogized by Dr. Scott, who introduced it into practice in the east, as applicable to all forms of hepatic disease, whether engorgement, torpor, obstruction, etc., provided no token of active inflammation be present.

The internal administration of this medicine is not very much dwelt upon by its advocates; but its application as a partial bath to the extremities is alleged to have exerted, in numerous instances, a prompt and energetic influence upon the liver, exciting without delay the desired hepatic action, and procuring at once a free discharge of bile through the proper emunctories. Wallace proposes, as decidedly preferable to this nitro-muriatic pediluvium, the immersion of the whole body in chlorine vapor or gas. Fumigation, he assures us, thus made, renews and augments the hepatic secretion, and relieves the oppressed organ with more certainty and readiness than can be obtained from any other remedy. A peculiar cutaneous eruption, known as the "chlorine rash," is produced by the action of the stimulating gas upon the surface, which is considered as beneficially revulsive, and its appearance regarded, therefore, as a highly favorable symptom.

It is in this form of jaundice that the tonics, especially the vegetable bitters, have done most service. I prefer to unite them with some mild laxative, as the bowels are so generally slow and torpid. The combination of columbo with rhubarb and an aromatic is a convenient formula.

5. Icterus, from obstruction associated with, or occasioned by, the presence of biliary concretions—gall-stones—next demands our notice. These bodies are of very different constitution and appearance. They are mostly of a dark brown color, often yellowish gray, greenish, etc. I have seen them of an intense jet black, beautifully polished and lustrous. They are of every shape, and sometimes attain a great size. Heberden tells us that a calculus, weighing two drachms, was found in the gall-bladder of Lord Bute. Baillie mentions one as large as "a pullet's egg." Small ones, in great number, are collected in some patients. The author last mentioned says that he saw more than a thousand taken out of one body. Some of them are intensely bitter, others quite tasteless. They are soluble in boiling alcohol, in heated oil of turpentine, in ether, and in nitric acid. They are generally inflammable; but Baillie describes a species of very dark hue, "which did not melt nor blaze, but burnt like a cinder." They often consist, externally, of concentric lamellæ, being internally radiated or partly crystallized.

Writers distinguish these calculi into three varieties: 1. The cholesterine, of whitish or gray color, or brownish, crystallized, shining, lamellated. Cholesterine is a peculiar animal principle, erroneously supposed by Fourcroy to be identical with adipocire. It is partly soluble in boiling alcohol, melts in a high heat, and sublimes in a vacuum. 2. Mellitic calculus, the most common species of gall-stone; of a brownish color; always exists in numbers, and of course takes an irregular polygonal shape. The outer crust is composed of concentric layers of cholesterine, crystallized in small rays inclining to the centre. The nucleus consists of inspissated bile, picromel, and other animal matters. 3. Concretions of inspissated bile; these are not common, but their existence is undenied.

How these concretions originate, or by what vitiated state of the hepatic secretion they are generated, is not known. They are formed, at least in the large majority of instances, in the gall-bladder, where their presence seems to give no uneasiness. In the case of Lord Bute, above alluded to, the monstrous calculus there mentioned had produced neither jaundice nor any other derangement of health. I have myself often found such concretions in subjects presenting no additional appearance of disease of the liver or its appendages. To this rule of their entire inertness in the gall-bladder, there are, however, some exceptions on record. Sœmmerring states that he has seen several instances in which their presence had brought on ulceration of the inner surface. Baillie tells us that he had met with but a single example of this kind.

Generally speaking, it is only when one or more of them has entered the cystic duct, and is passing onward to the duodenum, that the patient becomes affected with any definite symptoms. Yet this membranous canal is so distensible and yields so readily that it is not rare, on examining the alvine discharges, to find in them calculi of notable size which have made their way without difficulty or annoyance. Baillie tells us, too, that he has seen the duct dilated to nearly an inch in the transverse diameter.

The presence of a gall-stone, which from its size or shape is hindered in its passage, is inferred from the sudden occurrence of great and very acute pain at the epigastrium, soon extending itself in the right hypochondriac region; it is complained of as intolerably severe and depressing, and is attended with dyspnœa and orthopnœa; the patient cannot sit erect, but chooses a bent posture, leaning forwards. There is sometimes pain at the top of the right shoulder, as in hepatitis. Nausea comes on, with great languor, frequent retching and vomiting. The abdomen feels full and oppressed, and all the clothing about the person is eagerly loosed; and this sensation is soon followed by actual distension, a tympanitic resonance and elasticity being perceived on examination. At this stage the pulse is little, if at all affected; it is not until some hours have elapsed that it becomes tense and corded.

The effects of this mechanical irritation and obstruction are threefold: First, we have the liver engorged, and its acini and smaller tubuli filled with its secreted fluid; the whole organ thus suffers, and must either be relieved by the resorption of the bile into the system, and its diffusion through the circulating mass, or hepatitis must ensue, of more or less acute character, according to circumstances. In either case we have icterus produced—simple or complicated. Next, we have the digestive function impaired for want of the due admixture of bile, which, whatever may be the nature of its agency in the affair, cannot be dispensed with. Without it, we know, that fecification is, to say the least, incomplete; the contents of the primæ viæ are unnatural, and give rise to irregular and irritative movements, and assimilation ultimately ceases. Thirdly, a very important train of consequences may set in, not sufficiently dwelt on in the books, perhaps not clearly pointed out hitherto by any pathologist. The mechanical irritation of the duct gives rise, in certain instances, to a degree of inflammation which, either by continuity of structure, or from functional sympathy, is readily carried out throughout the intestines. Hence we have a duodenitis sometimes obscure, it is true, but occasionally well marked and violent. Nay, I have seen, from this source, inflammation supervene of the stomach and bowels, gradually running on in two cases to a fatal issue; in one with very extensive mortification. Blagden relates a case in which inflammation of the duct caused an abscess which pointed outwardly, discharging a calculus of an oblong shape, of nearly 1¼ oz. in weight. Thomas and others give us similar histories. We cannot in practice distinguish, from the cases thus described as depending on the actual presence of biliary calculi, such attacks as have been attributed to mere spasm and inflammation of the ducts themselves. Indeed, the only diagnosis possible between them would be the discovery of these concretions in the stools. Some have doubted the occurrence of a spasmodic closure of the duct in any instance, preferring to ascribe the obstruction to the inflammatory fulness and thickening of its tissues; but the suddenness with which the attacks come on, and the abruptness with which they subside and terminate, point out, I think, a condition different from the more permanent changes thus indicated; and where we cannot, with every proper attention, detect the existence of a calculus, we may not unreasonably infer a spasm of the duct. Perhaps it would even be proper to say that, in so dilatable a membranous tube, the supposition of a spasmodic constriction is absolutely necessary to account for the detention of a concretion of moderate size, and all the consequences following thereupon. And if the irritation of a gall-stone may produce such spasm, such constriction, why not the passage of morbid, vitiated, acrimonious bile? The occurrence of these attacks is almost wholly confined to persons who have lived in malarious districts, have been affected with miasmatic diseases or liver-complaints, and have suffered from alvine discharges, of a highly acrid, nay, almost corrosive and burning acrimony. I saw in many paroxysms of this sort, assailing suddenly —and, until the last fatal attack, subsiding as promptly—a medical friend, whose constitution had been broken up by practice in our low country. Examinations of his stools made for several months failed to detect a single gall-stone; nor did we find one on *post-mortem* examination.

But gall-stones may in various modes evade detection. Some years ago, there died of the obstruction and irritation belonging to this morbid condition a very distinguished member of our profession. He had for a long while suffered at intervals from attacks of this kind, in one of which I saw and attended on him. There was intense epigastric pain, with cramp, great physical and mental depression, vomiting and hiccup. These symptoms gradually subsided, and he recovered slowly, and without jaundice. The fatal attack was, I am told, very similar. I did not see him. On *post-mortem* examination a large gall-stone was found obstructing the duct, which "was shaped like a thimble, and of about the size of an ordinary one. There were several such in the gall-bladder; and one had ulcerated its way into the peritoneal cavity without producing peritonitis."

How it happens that in this and similar cases the obstruction fails to produce the discoloration of jaundice is as difficult to explain as it is to account for the non-excitement of peritoneal inflammation when a gall-stone—and why not bile with it?—was intruded into the serous sac investing the contents of the abdomen, always ready enough to take on inflammation. But the books contain many strange histories of such anomalous facts. Cheston records a case in which, without jaundice, the gall-bladder was found, after death, to contain two quarts of bile. Van Swieten tells us of a lad of 12 years in whom the same cavity contained eight pounds of bile. Cline relates an instance in which a tumor, pointing externally—the gall-bladder doubtless—was opened and discharged twenty ounces of "bilious matter." This patient did not die until seven days afterwards.

6. We meet occasionally with an obscure variety of jaundice of sudden and abrupt invasion. The symptoms of this class of cases are precisely similar to those recorded under the last head; pain at the pit of the stomach, sometimes also in the right hypochondrium and at the top of the right shoulder; nausea and vomiting, flatulent distension; tenderness on pressure over the belly; meteorism, obstinate costiveness or teasing diarrhœa with unnatural stools, acrid, and inflaming the parts about the anus; great mental anxiety; the pulse not affected for some hours, but afterwards excited, frequent, and tense; the eye and whole surface assuming a deep yellow or orange hue. But we can detect no gall-stone. The predisposition to this form of icterus consists, doubtless, in some obscure hepatic derangement which the minutest examination, after death, has failed to point out. The exciting causes are generally such as disturb the digestive function; a meal of improper food, or the undue use of acids; violent agitation from any passion, more especially grief and anxiety; exposure to cold, moisture, and sudden changes.

The *treatment* applicable to the last two classes of cases is precisely the same. If the patient be of ordinary strength and vigor of constitution, venesection must precede every other remedy, and requires to be carried out with a freedom and boldness proportioned to the urgency of the symptoms. The patient should be kept in the erect posture, or near it, in order that a more prompt and complete relaxation of the whole system may be effected. The warm bath will aid very much in bringing on this condition. Opiates must be freely administered and repeated until the intensity of the pain is subdued. If the stomach will bear it, the tincture of opium should be preferred; solutions of the salts of morphine are less offensive, but sometimes the pill only will be retained. Full doses are required; I prescribe from two to four grains of the drug, or their equivalent, repeating every hour *pro re nata*. It is well to combine it with calomel also in efficient amount. Opiate enemata should also be exhibited without delay, and fomentations or warm mustard poultices applied over the whole abdomen, but especially to the pit of the stomach.

I should not now hesitate in any case of such intense suffering to resort to the inhalation of chloroform, and to bring the patient without delay under its most excellent anæsthetic effect. This may be managed in the usual manner; but I prefer, as apparently safer, the breathing into one nostril, the other being closed, from a wide-mouthed vial containing the fluid. In a few minutes the influence begins to be felt, and increasing steadily can be graduated by the patient himself, who may stop the inspiration as soon as the pain is sufficiently relieved. A preference is given by some to ether as less to be dreaded, and by others to the combination of the two valuable agents. When we have thus obtained some respite, an active cathartic must be given. If the patient can retain castor-oil, it is to be preferred; if not, the neutral salts may be substituted, and the use of these in proper doses and at requisite intervals should be continued for a considerable period, in combination with some of the resinous purgatives—aloes or rhubarb. Mercurials do not seem to me to be of the special necessity or advantage so often contended for, until the case has been protracted into its chronic condition, and the sufferings of the patient, whether from mechanical or specific irritation, have at least, in a great measure, subsided. They are now of great utility; small doses of them may be persevered with until the production of a light ptyalism, the disappearance of the sallowness of the skin and eyes, and the return of appetite and alvine regularity, mark an established convalescence. In this stage we may also make trial of the nitro-muriatic bath, whose introducer, Dr. Scott, affirms that he "has often known it, when used in the midst of a severe paroxysm of spasm in the bile ducts, operate like a charm, giving almost immediate relief."

Some practitioners are in the habit of prescribing emetics in these attacks, with the hope of promoting the more rapid advance of the calculi through the duct into the duodenum. They select, for this purpose, the mildest and most relaxing articles, such as oil or ipecac., and administer them in such doses as to give rise to prolonged nausea and full, free vomiting. But the cases I have met with have all been attended with retching and vomiting, frequent and abundant enough to render any further efforts in that way unnecessary, if not injurious and improper. Nor do I place any confidence in the exhibition of the proposed solvents of biliary calculi—turpentine, ether, nitric acid, etc., though recommended by Durande and others. I do not understand how their agency can be applied, and, except ether, they are all irritating and unsuited.

It is highly desirable to prevent the recurrence of these paroxysms, as they are attended not only with unspeakable suffering to the patient, but with urgent risk of enteritis, and must by repetition break down and destroy the firmest constitution. I know no means which promise more benefit than those already advised, as tending to promote, hasten, and render permanent the lingering, irregular, and uncertain convalescence from chronic hepatitis: a change of climate, carefully avoiding the summer and autumn of hot malarial districts; annually repeated visits to the established watering-places, purgative and diuretic springs, such as Saratoga, the White Sulphur, etc.; great prudence in abstaining from all excesses, mental and physical; the observance of nice temperance in the pleasures of the table and the use of vinous and alcoholic drinks; the wary adaptation of the clothing to alternations of atmospheric temperature and condition; the abandonment of all sedentary and indolent indulgences; and the establishment of resolute habits of energetic occupation and systematic exercise.

SPLENITIS.

In all warm climates, subject to the influence of malaria, enlargement and induration of the spleen are familiar phenomena. As the consequence of intermittent fever, it is, indeed, well known, wherever that disease prevails, whether in Lincolnshire, Walcheren, or South Carolina. The nature of this enlargement is not well understood. The organ is of the erectile structure, and is liable to sudden intumescence, as has been repeatedly observed during the chills of a tertian. Andral noticed remarkable changes of bulk in the spleen of a dog, during a painful experiment upon the animal. *Ague cake* is supposed, by some writers, to be a mere passive congestion or hypertrophy, and sometimes attains, from the repeated concussions of ague, an immense size. Lieutaud mentions a woman who had for seventeen years a spleen that weighed thirty-two pounds. Sauvages speaks of a scirrhous spleen weighing thirty-three pounds. The largest that I have ever seen weighed but ten pounds. Some of the most enormous in bulk do not, by any means, prove proportionally heavy.

I am satisfied that this ordinary condition of mere hypertrophy degenerates not unfrequently into a chronic inflammation. It may—though this must be very rare indeed—give rise to *acute* splenitis. Yet I am unwilling to allow even this, unless some incidental contingency be added, some influential and energetic cause of novel character, brought into play. Among all the numerous cases of enlarged spleen that I have had occasion to see, but a single one has terminated in this way. A little girl, æt. five years, who had suffered much from fever in our low country, and had labored under a chronic inflammation of the spleen, with great enlargement, giving rise to much suffering and inconvenience, was seized, while on a visit here in May, 1838, with scarlatina. She passed through the disease, which treated her severely enough, but when convalescent, complained anew and loudly of her side, which was very much distended and painful when pressed upon. After some weeks' illness, she died, vomiting pus in large quantities and of very offensive odor. I was not permitted to examine the body, but was fully satisfied that the matter flowed from a splenic abscess, which, by adhesion, had connected itself with the stomach, and burst into its cavity. In a very large majority of cases, the swollen and indurated viscus remains little changed throughout life, giving annoyance by its weight and bulk, and inducing anasarcous swelling of the lower extremities, and perhaps even ascites, by its mechanical pressure upon the abdominal vessels.

I have had under my care two well-marked instances of *chronic* splenitis, neither of which had any connection with previous fever. Their cause was obscure; in one, the termination was fatal—the other, after suffering many months, has perfectly recovered her health.

The *symptoms* are not likely, I think, to be in any degree equivocal. The locality of the pain complained of, the bulk of the tumefied viscus, and the absence of the specific tokens of the disorder of other organs, leave little or no room for error, and these remarks apply as well to the acute as to the chronic variety of splenitis.

The changes which the spleen undergoes from the action of disease are various; suppuration, hemorrhage, tuberculation, hypertrophy, with induration on the one hand, and softening on the other, and a peculiar alteration or dissolution of its substance. This latter is described by Heberden and Abercrombie, and is affirmed to have been the usual consequence of fatal attacks of the celebrated Walcheren fever. The term *scirrhus* is often employed when speaking of indurated spleen, but Baillie denies its propriety.

It is not well understood why this organ should suffer so much in fever. Andral has suggested that, in malarious cases, it is owing to changes wrought in the blood itself by the miasmatic poison. But it occurs in typhoid cases also, in forty-six dissections of which, by Louis, the spleen was found natural only in four. Rush, and some other physiologists, have imagined the function or use of this organ to be, to serve as a diverticulum in fevers universally, and the idea is, at least, plausible. The distensibility of its vessels is remarkable, and it is peculiarly liable to passive congestion. Its tissue seems unlike others both in elasticity and in tenacity. It is subject to rupture of vessels from many causes, and to laceration of its substance—an accident that frequently occurs from external violence.

The *treatment* of splenitis is unsettled, and by no means successful. In acute cases, depletion by the lancet, cups, leeches, and saline purgatives is indicated, and must be carried into effect promptly, and with as much energy as circumstances demand and admit of. If it assume the chronic form, our task is a very difficult one. The mercurial treatment, formerly so much relied on, has of late fallen into comparative disuse. A majority of modern physicians prefer to depend upon the continued exhibition of drastic cathartics, as the combination of aloes with rhubarb and colocynth, etc. Some, borrowing from the practice of the Hindoos, who give vinegar and steel, while they purge the patient actively, have added tonics to their purgatives, and prescribe both iron and bark, alternately with their cathartics.

For my own part, I cannot recommend any particular formulæ with great confidence, in this obstinate malady. I think I have found most benefit from the use of iodine combined with mercury, as in the deutiodide of mercury and potassium, while the patient's bowels were kept soluble by the employment of blue pill, with rhubarb, in such doses as were requisite, never pressing this matter very far. Cups or leeches over the tumor relieve pain. Fomentations applied to the side are also useful.

The diet of the patient should be light and nutritious. Tonics may be occasionally required, in which contingency I have been disposed to prefer iron, especially in the new preparation known as the tinct. æth. acet. ferri. If the pain be constant and annoying, I do not hesitate to resort to anodynes and sedatives. Many have recommended conium and hyoscyamus, but the preparations of opium, and the salts of morphine, are the only articles of this class that deserve the least reliance.

Enlargements of the spleen, though far more commonly met with in malarious regions, are not confined, it would seem, to these localities. Dr. Jackson lately exhibited to the Pathological Society of Boston a spleen which weighed several pounds, and was hard to the feel. The patient had never had intermittent fever, nor visited any district of country where such fever prevailed.

PAROTITIS—MUMPS.

Among the affections of the collatitious viscera, we must not omit to notice this familiar form of disease, which derives some importance, indeed, from the very fact of its frequent occurrence. It is, as its name imports, an inflammation of one of the salivary glands, the parotid; arranged in Cullen's nosology as a species of Cynanche, *C. parotidæa*, and entitled by Parr, *Angina parotidæa.* From the difficulty of opening the mouth to speak, and the sullen expression of countenance produced by this enforced silence, and the attendant swelling, it has received the English appellation of *mumps*, by which it is universally recognized.

It consists in a painful swelling of the parotid, which renders all motion of the lower jaw difficult and uneasy; there are occasional paroxysms of severe suffering, intense aching, in which the ear of the swollen side is apt to partake; deglutition is very inconvenient. Both glands may be affected, but it is often confined to a single one. In the former case, the tumefaction usually becomes enormous, extending over the neck beneath the chin, down upon the breast, impeding respiration more or less, and up along the cheeks, and eyelids, and forehead, so as very much to disfigure the countenance. It is attended meanwhile by symptomatic fever, with the usual phenomena—hot dry skin, hard frequent pulse, thirst, furred tongue, gastric uneasiness, sometimes running on to retching and vomiting, general distress, restlessness, and dejection of spirits. It is specifically contagious, and attacks but once.

A singular and interesting point in its history is the marked tendency which it exhibits to a so-called *metastasis*—translation of the morbid affection from one gland to another, from the part first assailed to other and remote organs. In males the testis, and in females the mamma are liable to this secondary inflammation, which occurs only at, or after, the age of puberty. A similar metastasis, or transfer of morbid action, or obscure sympathetic extension of inflammatory excitement, is sometimes determined to the brain, producing phrenitis. Of this, which is denied by some writers, I have myself known three very serious and perfectly well marked instances. The duration of parotitis, when it runs its ordinary course in a single gland and subsides without metastasis, is not generally more than four days, and the patient, especially if a child, may complain very little, except when eating, or after talking freely. If it extend to both sides successively, a day or two will be added to the indisposition. If the metastasis occur, which, as I have said, is very apt to take place in the adult, the protraction of the case is irregular and indefinite, depending somewhat upon the constitution of the patient, and not a little upon the energy and propriety of the remedial management pursued. Suppuration of any of the glands thus inflamed, whether the mamma, testis, or parotid, is a rare termination. A perfect resolution sooner or later ensues, whether spontaneously, or as the effect of judicious treatment.

I have met with a few instances of a lingering tumefaction, or, as some have styled it, an induration of the parotid, which continues enlarged, hardened, and somewhat painful on handling; but even this is not permanent. I have, however, known this affection of the gland twice terminate in suppuration, after lasting several weeks in children three and four years old.

The breast and testicle sometimes fall into a contrasted condition, when the first stages of inflammatory excitement pass off, the injured gland wasting away, softening, and remaining smaller than its fellow, with a morbid degree of sensibility to external impressions, such as cold, pressure, or slight blows.

The general *prognosis* in mumps is of course favorable, although, as above stated, the metastatic attacks may be productive of some risk. This is particularly true of the cerebral affection, which occasionally supervenes.

Treatment.—Under all the ordinary contingencies of this familiar disease, very little medical interference is required. It is precisely to such cases as these—transient, destitute of malignancy, and self-limiting in the true sense—maladies which run a definite course, and then spontaneously subsiding, pass entirely away; it is precisely to such cases that the medicine expectante, and its German modification in homœopathy, are adapted. It is from such as these that it was at first derived, and spread by timid and illogical inference over the whole field of rational therapeutics. Yet even here, although in general it is as well to advise merely rest, seclusion, and abstinence, the local symptoms may assume an inordinate intensity, the constitutional irritation may run unduly high, and the patient may derive from prudent and judicious interposition a very notable and grateful palliation of his sufferings. The administration of a gentle cathartic, the application of a few leeches upon the tensest point of the swelling at first, and afterwards of tepid fomentation, will give some relief. If the glandular enlargement exist more than two or three days, the skin over the tumor may be irritated moderately with the lin. volatile, or some other mildly stimulating embrocation; a strip of flannel being worn around the neck and jaws.

When the patient on the third or fourth day complains of a feeling of uneasiness, weight, or tenderness, in the mamma or testis, matters have assumed an entirely different aspect; the secondary affection has nothing of the self-limiting character which belonged to its original, and a vigorous interference on the part of the medical attendant becomes necessary to arrest the impending evil. The diseased action thus transferred or extended must be subdued promptly, or a foundation may be laid in these structures newly disordered, for troublesome and lasting mischief. Venesection, if it can be borne, is to be prudently resorted to, and carried to as free an extent as circumstances permit.

Topical depletion is not less important, and leeches should be applied, in large numbers, to the painful part. Warm irritants are advised to be applied upon the parotids, to invite the malady back to its primary seat. There is no objection to this measure but its absolute futility; the speculation upon which it is based is not more groundless than the practice is unavailing. The period of parotid affection having passed away, returns no more.

Purgatives are useful here, both as depletory and revulsive, and the neutral salts deserve an unqualified preference. Indeed, the antiphlogistic regimen in its full extent must be carried into strict execution. Some physicians lay great stress upon the efficacy of emetics frequently repeated. The course appears to me unnecessarily harsh, but I place not a little confidence in the sedative influence of antimonials, in doses which nauseate slightly, or not at all. The solution of tart. antimon. or the pulv. antimon. with nitrate potass. may be employed in quantities sufficient to reduce the force of the circulation and keep up a free diaphoresis. I do not hesitate to relieve pain, and subdue restlessness, by the use of anodynes. The pulv. Doveri, or solutions of the salts of morphine, may be given *pro re nata.*

As local applications, I prefer, at first, warm and relaxing fomentations; they promote the flow of blood from the leech-bites, and diminish the tension and pain complained of. After awhile they become irksome, and should be abandoned, substituting for them, not abruptly, but after a short interval, sedative and astringent lotions of acet. plumbi, etc., or an alum curd. The recumbent posture should be long and steadily persisted in, and the male convalescent, when he arises from bed, directed to keep his testicle suspended properly and carefully. Females should be warned to avoid all undue pressure from stays, corsets, and other articles of dress, which will give rise to prolonged or repeated inflammation of the breast, and may even produce scirrhus and its results.

These swellings may become indurated and indolent by protraction. Epispastics should be applied to them from time to time, or iodine lotions and ointments; while the solution of iodine should be administered internally, and with perseverance, occasionally interposing frictions with mercurial ointment externally, and the internal exhibition of a few grains of calomel or blue pill.

When the brain becomes the seat of consecutive or quasi-metastatic inflammation from parotitis, the system of active depletion must be carried out promptly and decidedly. Here we have at once developed a wild delirium, or furious mania, with turgid visage, bloodshot eye, a full, hard, bounding pulse, and every token of high febrile excitement.

The lancet holds the first place among our remedial means. The patient should be placed in a sitting posture, with his head erect, and bled freely, from a large orifice, until syncope or yielding of the strength warns us to stop. The hair should be cut close or shaved, and cold affusion made repeatedly upon the scalp; purgatives, the saline especially, freely given; and sinapisms, and afterwards vesicatories laid to the extremities.

These cerebral symptoms are sometimes of low or typhous character, with feeble pulse, cold skin, muttering delirium and prostration of muscular strength. Here an entirely opposite course of treatment is required, and we must resort to energetic stimulation and the assiduous use of counter-irritants.

I have followed without hesitation the usual custom in considering mumps a true parotitis, but Graves maintains that the gland itself, the parotid, is not affected in this and similar cases. He was led to this opinion from an examination of "the tumors in the neck, which coming on toward the termination of fever, not unfrequently suppurate, and which have been regarded as the consequence of inflammation of the glandular system. According to the best authors, the parotid and submaxillary glands are the parts thus enlarged, and the tumors so formed are either fatal symptoms, or else, becoming the seats of a benign suppuration, prove salutary, or even critical." (Vol. i. p. 193.) He goes on to state that "these tumors are not glandular, though they closely resemble mumps. The parotids were found raised up by the tumors, but were not enlarged or otherwise altered in structure, except that the interstitial areolar, tissue was, as it were, bathed in a reddish serous fluid. A similar fluid abounded in the subcutaneous areolar membrane of the neck." Cases in which these swellings attend the advanced stages of yellow and other fevers among us do occur and prove fatal sometimes; but I do not remember any such in which we have an account of a well-conducted *autopsy*. Nor do I know of a *post-mortem* examination in mumps. Graves says the same thing, but infers from the analogy with the apparent parotitis of fever, which is not real, and from the fact which he asserts, "that the salivary secretion is not affected," that this swelling also is owing to interstitial effusion. But his reasoning is not satisfactory. *Mumps* is clearly a morbid affection determined to the glandular system, as is shown by its promptness to attack the testis and mamma; and I have, I think, observed that the salivary secretion is painful. A child will cry with pain on the approach of food before he has made an effort to take it; I have thought, from the flow of saliva excited by his appetite for it.

Horner, in his work on *Naval Practice*, mentions a curious case in which the mumps came on, as he well expresses it, "in a reverse manner, the right testis having been tumefied and inflamed before the parotids were sensibly affected."

In the *Trans. Am. Assoc.*, vol. v., we have an interesting account of the epidemic prevalence of mumps in Gouldstone, a straggling hamlet of mulattoes in New Jersey. There were 210 cases in a population of 350. It generally swept through a family, beginning with the parents. An infant, nine months old, was attacked, and three persons between fifty and seventy. No death occurred. The time of increase was usually three days; of decrease, three days more. Both sides were generally affected; one succeeding the other. Metastasis occurred to the testis, breast, bowels, brain, and uterus. One instance of suppuration took place, the abscess bursting internally.

In the same year, it is stated, the disease was epidemic also in the southeastern part of Pennsylvania. A few cases showed determination to the brain, with drowsiness and stupor, almost amounting to coma, and requiring active depletion.

SORE-THROAT.

Sore-throat—*angina pharyngea;* Pharyngitis—*cynanche anginosa.*—This malady, which after all the attempts to give it a name, is best designated by its ordinary appellation, is one of our most frequent diseases. It is essentially pyrectic, and is properly divided—in reference to the type of fever attendant upon it, and the state of the general system in which it occurs—into *inflammatory* and *malignant.*

INFLAMMATORY SORE-THROAT presents several varieties. The first is a mere *superficial* inflammation affecting the lining membrane of the posterior fauces and isthmus, the uvula, tonsils, pharynx, and upper part of the œsophagus, without lesion; the second attacks the same tissue, with *ulcers* more or less deep and extensive; the third, the *phlegmonous*, as the phrase imports, affects not the surface merely of the lining membrane, but the tissues beneath, exhibiting abscesses in the tonsils and on the back of the pharynx.

It occasionally happens, whether from any peculiarity in the nature of the inflammation present, or merely from its intensity, that a layer of whitish or yellow lymph is thrown out upon some part of the surface, to which it adheres, but perhaps not very closely, and is usually taken for an ulcer. This is known as *diphtherite—membranous* sore-throat.

The exudation resembles the membrane formed in croup, in diarrhœa tubularis, etc. It seems to be connected with an obstinate and tenacious form of morbid action, which may run into a chronic state. I regard diphtherite rather as the result of a special diathesis than of intensity of inflammation. It is often met with in numbers in a given locality, and we are becoming more and more familiar with it as prevailing epidemically. Thus it spread widely in California in 1855 and '56.

1. Superficial inflammation of the throat is attended with redness of the diseased part, its vessels being enlarged and distended, as in conjunctivitis. There is a sense of dryness, with pain in swallowing; the uvula is relaxed, and sometimes œdematous, occasioning a tickling and disposition to cough. When the inflammation is great, there is sometimes otitis, with severe pains in one or both ears, attributed to its extension along the lining membrane of the Eustachian tube.

Again, there is often a thick, condensed, and highly offensive mucus, collected in hard lumps in the foveæ or crypts, which indent the surface of the tonsil. They are apt to be mistaken for ulcers. I sometimes press them out with a probe, to the great relief of the patient. If they remain in the cavities in which they are formed, they occasion swelling and pain, and perhaps are loosened by a slight suppuration and hawked out.

2. Ulcerous sore-throat, *cynanche ulcerosa*, presents also various mo-

difications, the ulcers assuming very different aspects in different cases. Some of these varieties, it is well known, are peculiar and characteristic, in accordance with the specific state of constitution of the patient, as in scrofulous and venereal maladies. But of these I do not propose to treat in detail. That which is the subject of present discussion, and is connected with ordinary inflammation, under common circumstances, is at first irritable and very sharply painful; its surface is gray or whitish, with red points—the edges being swollen, it seems excavated; it is disposed to extend itself in all directions, with a rapidity proportioned to the intensity of the inflammation connected with it. After a time, if the ulcers do not heal, they become indolent, stationary, and chronic; while the sympathetic constitutional irritation subsides wholly or in part. They occasionally extend slowly down the œsophagus, healing at some points, and spreading at others; the cicatrices where they heal contracting, and rendering deglutition exceedingly difficult and painful.

3. Phlegmonous sore-throat—*cynanche tonsillaris*—quinsy. On looking into the throat, if we find one or both of the tonsils projecting, with a fiery red and smooth surface, we have reason to fear the formation of abscess within their substance. This is to be dreaded, as occasioning great and protracted suffering, by the impediment thus offered to deglutition and respiration—so great, indeed, as sometimes to threaten suffocation. Even when we succeed in procuring resolution, there is often left an enlargement and induration of the tonsils, which impair both the speech and hearing. There is now and then, though rarely, abscess formed at the back of the pharynx; and we have on record a few terrible instances of abscesses in the œsophagus.

Causes.—Sore-throat, in its several varieties, is excited by exposure to vicissitudes of weather and alternations of temperature; to currents of cool and damp air, showers, etc. In some individuals and families, there is special predisposition to it. It often spreads as an epidemic.

Prognosis.—In the adult of good constitution, there is little danger, though fatal instances are now and then met with. Chronic ulcer of the throat may wear out the powers of life by the constant irritation, and by its extension along the œsophagus, producing stricture of this tube.

In the child—the infant—sore-throat is a more serious disease. Even the superficial inflammation is not without some risk, being at this age readily convertible into the ulcerous; and if the ulceration extend into the larynx, the case becomes a very serious and alarming one. The membranous sore-throat, described in a former paragraph, is perhaps even more dangerous. I scarcely know a more formidable disease than this modification of sore-throat, combined with laryngitis or croup.

"The exudative inflammation" of diphtherite is correctly affirmed by Dr. H. Green to commence "invariably in the superior portion of the respiratory passages and extend from above downward." He justly lays great stress "on the physiological and pathological relations which exist between the throat and the respiratory passages," which he considers of great intimacy and importance.

I do not remember to have met with the phlegmonous form, quinsy, in a very young child.

Treatment.—In a robust adult, it may be necessary to bleed freely from the arm. Local bloodletting by leeches is almost always useful. Crampton and others propose to carry them to the inflamed spot.

Emetics are often given in the first stage, and with advantage, if the stomach is oppressed, the tongue foul, and the breath fetid, without vomiting. Cathartics, especially the saline, are almost universally required. They may be combined with diaphoretics, as, at first, ipecacuanha and antimony, and afterwards with the infusion of serpentaria or seneka. When farther depletion is unnecessary, we may reduce the force of the circulation by moderate doses of nit. potass. combined during the day with an antimonial, and at night with Dover's powder. Various local applications are recommended. Velpeau's suggestion of the application of powdered alum has proved very useful. The remedy, he himself says, however, is only of benefit in the superficial pharyngitis; it does harm in the tonsillary or phlegmonous.

I disapprove of all gargles in the early stage, as painful and irritating. The steam of water at a moderate heat may be inhaled, to relax and soothe the parts and procure a flow of saliva and mucus. After a time, the sedative and mildly astringent solutions may be of some advantage, more especially where there is ulceration. Nit. potass., alum, sulph. zinc, acet. plumbi, and the mineral acids are much used. Infus. cinchonæ and myrrh are among the best. This may require special attention in the case of children, the foul secretions from whose ulcerated fauces it may be necessary to cleanse with a syringe, or a bit of lint attached to a probe.

Where any membranous deposit appears upon the surface, we must resort to the nitrate of silver. A strong solution of 10 grs. to ℈j in an ounce of water should be applied by a sponge or lint freely to the parts affected and repeatedly, until their condition is changed and lymph no longer effused. Many prefer to employ in this way the muriatic or hydrochloric acid. Both Bretonneau in France and Fourgeaud in California ascribe to it a specific efficacy.

The employment of the stimulating gargles, so much in vogue, requires judgment and discrimination. It cannot be denied that there are cases in which, even from the first, the infusion of cayenne is beneficial, but it is difficult to point them out; and it is a good general rule to abstain from the use of these washes until the ulcer has become somewhat indolent and the case assumes a chronic character. In such instances, good is done with the solution of the sulph. cupri, and by touching the ulcerated surface with the nitrate of silver. These cases farther demand the administration of alteratives and tonics. A mild mercurial course, as of blue pill or merc. corros. sub., may be alternated or combined with the use of the bark and the mineral tonics, of which the best is the tinct. mur. ferri.

The uvula is sometimes permanently elongated or relaxed so as to fall upon the back of the tongue, and keeps up a harassing cough, which, in some cases, has been the precursor of phthisis. To prevent this, it should be amputated. When the tonsil is so much enlarged as to impede the respiration, we must not hesitate to pass a lancet freely into and across it. If an abscess has formed, we evacuate the matter at once; if not, we give relief by diminishing the bulk of the tonsil, and reduce its inflammation by emptying its vessels. If the tumefaction be so great that the patient is in danger of being suffocated, an opening should be made in the trachea until the tumor subsides or suppurates. The tonsils remaining indurated and enlarged, they should be freely scarified in all directions, or completely extirpated.

MALIGNANT SORE-THROAT, *Cynanche maligna*, may be described as a combination of inflammation of the throat with the lowest grade of typhus fever. Sporadic cases are often met with, but it is apt to appear as an epidemic. Its proportional mortality is frightful. Its subjects are generally young persons and children, from infancy to puberty.

Symptoms.—The attack is ushered in with nausea, and sometimes vomiting; there is oppression, restlessness, anxiety; the voice is hoarse or husky, the skin dry and constricted; there is thirst; the pulse is small, compressible, very frequent; there is great languor and prostration. It is not in every case that there is any pain or difficulty in swallowing, but on examining the throat, we find a dusky redness overspreading the whole surface of the pharynx, fauces, tonsil, and uvula. One or more ash-colored ulcers may appear, which spread rapidly, with little or no pain; or, as is much more common, there is an exudation of plastic lymph covering the inflamed surface, to which it adheres pretty firmly. Pieces of this membrane are frequently thrown off, dark-colored and offensive, with a foul discharge from the surface. An efflorescence often shows itself on the skin, but by no means uniformly or even in a majority of cases, as affirmed by European writers, who often confound scarlatina anginosa and maligna with our present subject. As the disease progresses, the inflamed parts may assume a gangrenous disposition, becoming livid or even black, with great fetor. Diarrhœa comes on, and the patient soon sinks exhausted.

The *cause* of this malignant pestilence is unknown. It is usually epidemic in its prevalence. It is alleged, also, to be contagious.

The *prognosis* is highly unfavorable. The younger the subject, in general, the greater the danger. In early life there is special liability to the extension of the ulcerous action and effusion of lymph into the larynx, a combination almost always fatal. In older subjects we judge of the degree of risk, as in typhous fevers, with less reference to the local affection.

Treatment.—The general management of the patient is similar to that recommended under the head of *typhus fever*. It is the usual practice to premise an emetic. Ipecac. is, perhaps, the best, but some prefer the antimonial, as more active, and others regard the sulph. cupri as exerting a special efficacy. I see no objection to either. Our permanent reliance is upon the class of stimulating diaphoretics which may be employed in turn; the infusion of serpentaria or seneka, the combination of carb. potass. with the tinct. opii camphorata, the acet.

and carb. of ammonia, the nit. ether with the infus. cinchonæ; a generous and stimulating diet should be allowed, with wine, in proper amount; if necessary, the bowels, in the mean time, being gently acted upon by some mild cathartic. I prefer, to all others, the combination of merc. dulc. with pulv. rhei, in small doses and at proper intervals.

Of local applications, I regard the blister and the leech to be alike of equivocal effect, and prefer mustard or lin. vol. to either. The throat and mouth must be kept scrupulously clean. The ash-colored spots must be touched with the strong solution of nitrate of silver or muriatic acid occasionally, and the foul secretions washed off with the syringe, or, if the patient can use them, with gargles. These should be somewhat stimulating. The infus. cinchon. with myrrh or camphor, with the mineral acids, is much to be confided in. The infusion of cayenne pepper is greatly in vogue, and often does good service. Besides this very useful local application as a gargle, it is, perhaps, our best internal stimulant, and should be administered freely. The infusion should be preferred as strong as the patient can take without suffering, and containing a small proportion of common salt. When its pungency cannot be borne, the pulv. capsic. should be prescribed in substance, made up into pills or covered in capsules of jelly.

Like all other typhoid affections, cynanche maligna is apt to produce or associate with itself some cutaneous efflorescence, which often resembles erysipelatous inflammation, but more commonly is a mere erythema. This is the source of the confusion so often made between malignant sore-throat and scarlatina maligna; and it must be confessed that there are several points in common, presented by the two maladies. But a careful examination will show the absence of many of the specific symptoms or characteristics of scarlatina in the merely anginose cases; and the absence of the ordinary sequelæ, and the subsequent liability to the true exanthem, leave no doubt of the essential difference that separates them.

In Dr. Drake's earliest work, *Notices concerning Cincinnati*, dated 1810, there occurs the following paragraph: "Angina maligna and scarlatina anginosa. The former of these diseases had an extensive and fatal prevalence in this country eighteen or twenty years since; the latter, probably, has never prevailed generally here." The former, indeed, is of frequent spontaneous origin; the latter waits to be imported and communicated.

SECTION III.

DISEASES OF THE RESPIRATORY SYSTEM.

NEXT in order we proceed to treat of the diseases of the organs of respiration, under which head we include the larynx, trachea, bronchi, and lungs. Here we shall meet with many of the most destructive, and some of the most rapidly fatal maladies to which the human constitution is liable. The necessity of an adequate supply of atmospheric air, and of its easy and unimpeded access to the cells constructed to receive it, is urgent and absolute. Any affection of the pipe or tube through which it passes to the lung must therefore be distressing and dangerous, in exact proportion to the degree of impediment presented to its entrance and escape, thus presenting an obvious mechanical risk in addition to the general irritation, and other ill consequences, which may arise from the nature and ultimate effects of such disorder.

The functions of this set of organs are complicated as well as delicate, in a peculiar degree. Some chemical changes evidently occur from the admission of air, and its contact with the blood diffused over the pulmonary tissue; these are cognizable to the senses, both as regards the blood and the air. But these constitute only a portion of the results; certain other changes, of a vital and undefined character, are inferred with little less clearness, although they cannot be made the subject of experiment and calculation. I allude to the animalization—the assimilation of the chyle, which is now conceived to be in great measure effected during the passage of the blood, with which it has just been mingled, from the right to the left ventricle. This blood is found to be not only redder from its loss of carbon and union with oxygen, but more highly vitalized and better fitted in every way for the support and nutrition of every part of the organism. Diseases of the respiratory organs may then become fatal in three modes, of which we shall meet with examples; 1. By their general influence upon the constitution, depending upon their nature and the sympathies which they excite, and analogous to the effects of similar derangements located elsewhere. 2. By impeding or impairing the ultimate assimilation of chyle, and thus depriving the blood of a due supply of its nutritive and stimulating materials, whence emaciation, exhaustion, and fatal debility. 3. By impediments offered to the passage of air in the air-tubes, producing mechanical suffocation.

Of late years *the exploration of the thorax* has claimed the special attention of the practitioner, and has been made the source of important and definite inferences concerning the actual state of the organs contained in its cavities.

1. When there is nothing to prohibit the exposure of the upper part of the body, the patient should be stripped and carefully examined with the eye and hand. Any want of symmetry of form, any inequality of, or difference between the two sides of the chest, must be carefully noted. Observe if the whole structure is heaved and elevated regularly by the motions of respiration; making the subject respire slowly and deeply, and rapidly. Note the relative position of the sternum and the arch of the cartilages, and examine the spine. There are some deformities which seem consistent with the enjoyment of health, such as the one-sided projections of the cartilages and sternum denoted by the phrases "cuirass," and "pigeon breast," and so on.

2. It is next proper to inquire into the capacity of the thorax. Unless in extreme cases, it is perhaps right to acknowledge that no great stress is laid on this method, considered absolutely; but in a comparative point of view, it is of great value. If the capacity of the lungs to admit air diminish sensibly from time to time, it is evident that the situation of the patient must be getting worse; on the contrary, we draw the most favorable inference from the fact that his inspirations are becoming fuller and deeper. It should be farther admitted, that none of our methods of examining into this question of thoracic capacity are very definite. There are three modes proposed. The first is a careful measurement externally. This being done accurately at proper intervals, we shall know if the flattening of the chest on either side increases or diminishes. The second is, by the use of some spirometer. The subject may breathe into a gas-holder or bell-glass, or common large bottle filled with water and inverted over a trough or basin. It is easy to mark how much water is thus displaced, and to compare this quantity at different periods in the progress of a chronic case. The third is often intuitively resorted to by patients for their own information. A subject whose lungs are capable of containing a large amount of atmospheric air may retain his breath a greater length of time than one who labors under any disease which renders the lung contracted in its capacity. The latter must breathe oftener to supply the demand for the depuration of venous blood sent into the pulmonary vessels. There is scarcely anything which annoys a patient more than the quick panting to which he finds himself a prey; it distracts and fatigues him. The extent of capacity differs in different individuals—some divers remain under water a full minute or even more—but to retain the breath or inspire slowly from thirty to fifty seconds, is good proof, I would say, of average capacity. Of course, we are better satisfied with comparative than with absolute inferences, yet the comparison must be fairly made. We must allow for the contingencies of accelerated circulation from fever or muscular action, which hurry the breathing greatly; and for the diminished cavity of the thorax after a full meal.

3. Of the Hippocratic succussion I shall say little. It is not in every case of thoracic effusion that this sort of agitation will detect the anticipated sounds. No result will follow the most abrupt movement or

arrest of motion of the trunk, in the manner proposed, unless where both an aerial fluid and a liquid are contained together in the sac of the pleura, as in pneumothorax, or in a large abscess or tuberculous cavity in the lung. Here we have a noise similar to, and produced in the same manner as the gurgling of water in a half-filled bottle. It is not heard in simple empyema, nor in hydrothorax, as many thoughtless experimenters seem to expect. Although, as I have said, it may occur in a large pulmonary cavity, yet this so rarely happens that it is now assumed as a positive diagnosis of pneumothorax. To hear this sound, you shake the patient by his shoulders to and fro while sitting before you, and then, stopping the motion suddenly, listen for the fluctuation described.

4. We come now to *percussion*—Avenbrugger's valuable suggestion. It is easy to point out to any one acquainted with the most elementary principles of acoustics, the rationale of all the inferences drawn from the reverberation of the chest, when struck upon at different points. Suppose the thorax of a healthy subject dried with all its contained air, it would return, upon being beaten like a drum, a hollow sound similar to what we hear from that instrument. The yielding nature of the soft intercostal tissues in the living state will obviously give less resonance than the rib when struck, and hence, Dr. Todd, of Connecticut, a sagacious disciple of Avenbrugger and Corvisart, was accustomed to examine exclusively, by tapping each rib separately, and all round from the sternum to the spine, with the end of a single finger. It is clear, still farther, as the sound depends upon the air within the chest immediately beneath the part struck upon, there will be less resonance just over the heart than on either side of it; and as a drum is muffled by being overlaid with any soft or comparatively inelastic material, so the thoracic resonance is impaired by solid deposit externally as in corpulence, and by effused fluid as in anasarca, and is less distinct under the scapulæ than elsewhere. When we have learned the kind and degree of resonance to be expected at the various points of a healthy thorax, we will be prepared to detect the presence of disease by the modifications, and impairment and want of resonance. These are occasioned by all the causes that affect the access and amount and movement of air within the pulmonary structures. Fluid contained in the pleural sac will, of course, make the sound beneath it dull. Solidification of the tissue, from whatever change of condition, has the same effect in proportional degree, whether it be constituted by hemorrhagic or inflammatory congestion, or hepatization, or tuberculous deposition, or any form of infiltration.

The resonance may be too great as well as defective in intensity. This augmentation may be combined with fluctuation in pneumothorax—exists in emphysema, and in perforating ulcer of the lung. The inferences from percussion require to be corrected and rendered definite by collation with the other modes of examination, a remark which indeed applies with equal truth to all, or nearly all. Scarcely one of them is so obviously diagnostic that we may venture to rely on it independently of concurrent observations made in different modes. Percussion is applied mediately and immediately. Piorry and Bennett, justly celebrated for their experience and sagacity, preferring the former, have laid much stress upon the use of the pleximeter, a plate of ivory upon which the percussion is to be made, by a proper hammer. Leather and caoutchouc have been also employed. With Piorry, I generally depend upon mediate percussion, but I use no other pleximeter than the fingers of my left hand, pressing them closely on the surface, and striking upon them with the ends of those of my right.

5. Manual examination of the thorax, and its movements, and the vibrations which these produce, is always of some importance, and should be made available, unless some prohibition present itself. It is most useful in the cases of children, in its reference to affections of the respiratory organs. In all it gives very definite information of cardiac complications. We thus discover the enlargement or violent and irregular action of the heart, and detect its displacement by pulmonary derangement or thoracic effusion. This mode of exploration, however, it should be observed, rather exhibits to us the locality and degree of disorder, than its nature.

6. *Auscultation.*—This is divided, like percussion, into mediate and immediate, and is defined "the listening to, or perceiving, the various sounds produced in the chest during the performance of the functions of the viscera contained therein, whether in a healthy or diseased condition." Direct auscultation is effected by laying the ear flat upon the chest at the point to be examined. This is always desirable to be done, when it is within our option; but there are very numerous cases, of every-day occurrence, in which it is totally forbidden—and it was in an example of this sort that the ingenuity of Laennec suggested to him a resource in the employment of a medium for the conveyance of sounds. Recollecting the facility with which a solid body communicates an impression made upon one end throughout its whole length, and a tube transmits the vibrations of air that produce sound along its canal, he "rolled a quire of paper into a kind of cylinder, and applied one extremity of it to his patient's chest, and the other to his ear, and was not a little surprised and pleased to find that he could thereby perceive the sounds within the chest more distinctly than by the ear."

Thus was constructed the first *stethoscope*, an instrument which, since that time, has undergone many changes of substance and of form. They have been made of various woods—of ivory, bone, horn, paper, and caoutchouc—with and without a central bore, simple and compound, to be listened to with one and with both ears; of one, two, and three pieces.

The normal sounds elicited in the acts of breathing differ somewhat in the various regions in which we hear them; the general sound is known as the "respiratory murmur." This murmur is naturally louder in children than in adults—whence the phrase, "puerile respiration;" it is perceptibly louder in inspiration than in expiration. There is a notable difference, which, however, is not easily conveyed by description, between this respiratory murmur, as it is heard in the pulmonary air-cells, in the bronchi, and in the trachea. Vesicular or cellular respiration is properly a mere murmur; tracheal respiration gives you the impression rather of a rushing—slight, but similar to that made by the passage of air through the nostrils or a bellows nozzle; and bronchial respiration partakes of both; in health it is distinguishable only over the largest bronchi. In an entirely natural state of things, the respiratory murmur is heard most plainly at those points which are most loudly resonant upon percussion, as upon the anterior chest, above the clavicle, and in the axilla. These sounds are liable to simple increase and diminution of intensity. A mere increase of the respiratory murmur in an adult, known as "puerile respiration," belongs to a stage of disease. The highest intensity of tracheal or bronchial respiration is heard in a broken-winded horse, or a roarer, as the jockeys call him; it is a species of defect, proving, generally, a diseased state of the organs, but as we learn from high authority, both on the bench and in the saddle, sometimes consistent with "soundness" in the technical sense at least. Puerile respiration in any part of the lung gives the inference that the remainder, or some considerable portion of it, is occluded or impeded, and performs its office imperfectly. It occurs in all diseases which impair the functions, therefore, of the lung, as pneumonia, hydrothorax, etc. Wherever it is very extensive, without apparent cause, we may suspect an obscure or insidious tubercular deposition to have been commenced.

The respiratory murmur is defective, wherever the cells and tubes refuse to admit air, as in pneumonia, congestion, hepatization, infiltration; and wherever any effusion is interposed between the parietes of the thorax and the lung, as in empyema, hydropleura, pneumothorax. Always compare the results of percussion with auscultation to prevent mistakes.

Of new or adventitious sounds produced by a morbid state of the respiratory organs, we have a considerable number noted and described by authors.

1. The mucous râle, or rhonchus, is heard in common colds, catarrhal fever, and humoral asthma; it is loudest just when a patient is about to cough and expectorate.

2. The crepitous râle is heard in the early stages of pulmonary inflammation. It resembles the sound made by the healthy lung when pressed in the hand. This is variously compared: by Dr. Williams, to the rustling of a lock of hair rubbed between the finger and thumb; by Laennec, to the crepitation of salt on a hot iron; by Andral, to the crackling of a piece of parchment.

3. The gurgling or bubbling sound is owing to the presence of a very great quantity of mucus, or other tenacious fluid; as when muco-purulent matter is effused and expectorated from a cavity or dilated bronchus.

4. A cooing or purring noise is in some patients very distinct; it depends, I would suggest, upon partial occlusion of certain portions, rather extensive than abruptly defined, of the bronchi, the air-cells or vesicles beneath them being permeable. I have met with it constant for months in young subjects of bronchitis; it is loudest during a

febrile exacerbation, when active exercise is taken, and just before a fit of coughing.

5. The sibilant, hissing or whistling sound. This I attribute to an occlusion, less extensive than the former, but more abrupt, and making a small aperture in the tube through which the air forces its way. It is less uniform or constant than the above.

6. The metallic tinkling, "tintement metallique" of Laennec, is said to resemble the sound emitted by a cup of metal or glass when gently struck by a pin, or when a grain of sand or a minute pebble is thrown into it. He ascribes it to the fall of a drop of some fluid from the top to the bottom of a large cavity, where it strikes on the surface of a similar fluid, and causes the sides of the cavity to resound. I do not think the rationale thus given clear or satisfactory.

Of *vocal* sounds. On laying the ear to the chest of a healthy person speaking—or applying the stethoscope—we perceive the same thrilling sensation that is felt by the hand; it may be described as a diffuse vibratory murmur. If we place the concave end of the instrument on the trachea, we shall hear, though with some indistinctness, the articulated words he is uttering. Over the largest bronchi we may still perceive articulation, though with still more indistinctness and somewhat confused with bronchial respiration; the vocal resonance lessening as we proceed along the tubes, until it disappears. As puerile and bronchial respiration are the first effects of impairment of the function of the lungs, so we shall find bronchophony to extend itself in the earlier stages of pulmonary inflammation. In certain cases we hear what Laennec has chosen to call "ægophony," as resembling the bleating of a goat. He explains it thus: "I consider ægophony to be owing to the natural resonance of the voice in the bronchial tubes, rendered more distinct by the compression of the pulmonary texture, and modified by its transmission through a thin layer of fluid in a state of vibration." This fluid must of course be in small quantity; if the amount is much increased, the sound is lost. He affirms that he observed it in almost every case of pleurisy under his care. Forbes says it is most noticeable "in a zone from the lower angle of the scapula following the lines of the ribs round to the nipple."

Pectoriloquy means, as the phrase imports, articulation or speaking within the thorax—breast-speaking, as it might be translated. It is one of the earliest and most striking discoveries of Laennec, and its explanation is obvious. It occurs only when there is a large cavity filled with air, into which opens freely a large air-tube. The articulatory vibrations are continued downwards, from the larynx into this cavity, and there renewed or repeated, so as to give rise to the phenomenon. Whenever it exists, we suspect disorganization somewhat extensive—the softening and evacuation of a tubercle, the emptying of an abscess. It is attended with undue resonance on percussion.

A method of exploration proposed by Marshall Hall, is to "insert a small flat trocar between the ribs into the thorax, in order to ascertain, in doubtful cases, the presence of air, serum, or pus, in the sac of the pleura." I cannot hold it a light matter thus to inflict a wound upon this membrane, inflammation of which is so easily excited, and productive of so much pain and danger, as we see when it is torn by the spiculæ of a fractured rib. I can only imagine one contingency in which I would consent to make this sort of examination; where paracentesis thoracis seems indispensable, and requiring to be immediately performed, in order to relieve the patient from the presence of air or effused fluid, and where the insertion of the trocar is only to be regarded as a preliminary step; like the sounding for stone after the patient is laid on the table, which, if unsuccessful in detecting its presence, shall render nugatory, at least for the time, all the preparations already made; but if successful, gives confirmation and clearness to the opinions previously entertained, and sustains the surgeon with the plea of preseut and urgent necessity.

CROUP—LARYNGITIS.

The subject of our present discussion may be affirmed to be one of the most common diseases of children. Its aspect is alarming, and its ravages, when neglected, or improperly treated, rapid and terrible; but it is consoling to reflect that, when opposed with promptitude and judgment, it may be confidently ranked among those maladies over which the powers of medicine exhibit most clearly their divine control.

Croup, although known to the ancients even as early as the time of Hippocrates, as has been proved by Coxe and Copeland, until of late years comparatively attracted little attention. Dr. Blair (in Scotland, in 1718) first described it under its present name, which I prefer to retain, because it is universally recognized and received.

Croup usually affects children—seldom before they have been weaned, or after they attain the age of puberty. It occurs, though rarely, in the adult. Every physician must occasionally meet with an instance of this sort; and every American is familiar with the fact that this painful affection terminated the career of our Washington. Marshall Hall gives two cases occurring in eminent physicians—Dr. Pitcairn and Sir John Hayes. Dr. Pitcairn had "an uneasy feeling in the larynx," and "wrote that his complaint was croup." I saw a very strongly marked attack (in consultation), in a lady of fifty years of age; and a patient of mine, who is nearly sixty, has been subject to it all her life. I have seen her frequently laboring under it.

In our country, this disease is so well known as scarcely to need a detailed description. It consists in a very distressing difficulty of breathing. The respiration is loud, hurried, anxious, performed with evident muscular effort, and a struggle painful to witness. There is cough, attended with a peculiar stridulous croaking and ringing sound, of which words can convey no adequate idea, but which, when once heard, will never be forgotten. It is described as resembling the barking of a dog, the crowing of a cock, the vibration of a brazen tube.

Croup is essentially pyrectic. The symptoms of local disorder, the change in the voice, cough, etc., may either precede or follow, at a short interval, the febrile movement. The eye is brilliant and suffused, the skin hot and dry, and the cheek flushed. Some writers have divided the history of the attack into three stages, and although the lines of transition cannot be always precisely drawn, yet the distinction should be kept in mind, as useful in the treatment. The incipient, or, as some call it, the catarrhal stage, is hardly to be discerned from the forming stage of catarrhal fever, except that, perhaps, there is somewhat more ringing or shrillness in the cough, and a less diffused râle throughout the chest. The age of the child should make us attentive to this matter. Croup is more to be dreaded while the process of dentition is going on, than at any other period of childhood.

In the next step of its progress, the disease offers, when exquisitely developed, a most impressive picture. The nostrils of the patient are distended by the struggle for breath, the eyes protrude, inspiration is attended with a harsh whistling or wheezing; the face, at first flushed, becomes irregularly livid; the child grasps its throat with its hand, and complains of pain seated there; the pulse becomes extremely frequent and corded; there is incessant restlessness, and the little sufferer, by its expression of countenance, its moans, and its entreaties for help, with every other sign that its age and degree of intelligence admit of, shows the highest intensity of distress. The cough is at first loud, dissonant, and accompanied with the peculiar sound formerly alluded to, but after a time becomes lower and feebler; and in the third stage, which has been regarded as a condition of collapse, is little more than a whispered or wheezing effort.

The face now assumes a more livid hue, or is very pale and swollen, the skin is covered with a clammy and abundant sweat, and the extremities are cold. The shoulders are elevated, and the chest heaves with the struggle for breath. A mucous râle is heard throughout the thorax, and the action of the heart, though convulsively frequent, grows weaker. There are two modes in which the fatal termination may take place: either the symptoms just recounted increase with rapid progression, and suffocation ensues from the clogging up of the larynx with its own tenacious effusions; or, the signs of spreading inflammation extend into the bronchi, and even affect the pulmonary tissue; while a certain amount of expectoration, which follows each effort in coughing, protracts the case (even though beyond the hope of ultimate relief), it may be, for some days. During this condition of things, respiration is unequal and irregular, sometimes very slow, at others exceedingly hurried, and performed with violent exertion of all the muscles which can be brought into play.

The pathology of croup has been much discussed. I have never seen a case which was not decidedly inflammatory and attended with marked febrile symptoms. There are practitioners, however, who look upon the disease as presenting occasionally a purely nervous or spasmodic character. I do not doubt that the laryngeal irritation may and does excite a degree of spasmodic action of the muscles of the glottis, and others concerned in respiration, and that this secondary or sympathetic may outrun in vehemence the original mode of irritation in nervous and highly excitable individuals, so as to become a prominent and paramount condition; and thus I regard the alleged cases of nervous or spasmodic croup.

The inflammation of the larynx and trachea, which constitutes this disease, frequently gives rise to the production of an albuminous exudation of organizable lymph, rapidly condensed into a pseudo-membrane lining the tube. This is considered, by certain writers of France and England, as a test, or diagnostic symptom. Good makes it an essential characteristic, and Guersant and Bretonneau speak of the cases in which it does not occur as "false croup." The majority of writers agree, however, that this is an error. This membrane or layer of lymph does not always present itself in the worst cases. The changes shown in *post-mortem* examinations are various. The mucous surface of the larynx and trachea is, in most cases, swollen, reddened and covered with an effusion of tenacious mucus, which extends generally throughout the bronchi and air-cells; this is sometimes purulent and sometimes tinged with blood. In others, the false membrane is found in various states; sometimes tenacious and adherent; sometimes loose and in mere shreds or flakes.

In a recent paper by Prof. Peaslee, the pathology of croup is presented impressively and with great precision. "Croup is a laryngo-tracheitis, not essentially different from other inflammation of the parts, either in an infant or adult. It is generally preceded by catarrh, or at first catarrhal. The plasma-exudation may or may not occur. In Dr. Ware's *Contributions*, false membrane is stated to have been formed in twenty two cases out of 131—about one-sixth. This exudation is rarely absorbed. It may be coughed up. It may become degenerated into pus and detached, which is the more common result. It may become organized into a false membrane."—*Am. Monthly*, Jan. 1854.

Nor are these results of diseased action confined to the larynx and trachea. The minutest ramifications of the bronchi, and the smallest air-cell are found filled and clogged up with the same tenacious mucus, or choked with a similar membranous formation.

In one case which I saw, the bronchi, as well as the trachea and larynx, were lined extensively with this pseudo-membrane, of so dense and tenacious consistence that it was easy to draw it out in long tubes resembling the finger of a glove. Dr. Bard, in his essay on croup, affirms that he has found the lungs so dense and solid that they exhibited the appearance of the structure of the liver. Cheyne and Baillie have both made the same observation. To these morbid changes, Dr. Marshall Hall adds another—œdema of the glottis. Bland distinguishes laryngitis into three kinds or degrees, which he has designated from the Greek: 1. Myxogene, when mere mucus is expectorated; 2. Püogene, where pus is effused; and 3. Meningogene, when the membrane is formed. The idea is ingenious and plausible.

The *causes* of croup are numerous, comprising all the circumstances which give rise to catarrh, sore throat, etc.—such as exposure to sudden changes of temperature, or currents of cold, damp air, wet clothing, wet feet, falling asleep in the night air or dew. Easterly winds are, with us, among the most frequent exciting causes, as being cool, raw, and sharp. Familiar experience ascribes it to all such agents as occasion a suppression of the natural and healthy cutaneous transpiration.

A predisposition to it is often hereditary, and transmitted through many generations; it is built up, undoubtedly, under various conditions, arising from previous attacks, a repetition of which will most remarkably increase the degree of susceptibility to the invasion. This susceptibility became so great in one child under my care, that she did not escape an access for any entire fortnight, during a period extending from her being weaned to her fifth year. In my own experience, children between two and four years are the worst sufferers by it. It is rare before weaning, but Duges says that he met with it in a child only a few days old.

The gastric origin of croup is not mentioned, so far as I know, by any author; but I am sure I have often had occasion to consider the presence of undigested food, and other irritating crudities in the stomach as among the causes of the disease; and the remark is a familiar one, in some households subject to its frequent presence.

Croup has been regarded as endemic, epidemic, and contagious. There are no reasons that weigh with me for attributing to it those qualities. It is more definitely, than almost any other malady, the result of particular conditions of atmosphere, and of special exposures.

The *treatment* of croup has become so generally understood, that notwithstanding the frightful rapidity of its access, and the evident tokens of imminent danger which attend from the first, it is in a great many families confidently believed to be under domestic control. And, indeed, the domestic management of the early or invading stage of croup is usually successful. This stage, as I have already said, is marked by the symptoms of catarrhal affection. The child sneezes and coughs, perhaps in a shrill tone. If of sufficient age and intelligence, it takes warning and complains of the approach of its tormentor, pointing out the larynx as the seat of uneasiness. At this period we shall seldom fail in the attempt to arrest the disease, and prevent its farther progress, by the free use of opium. I prefer the common preparation of paregoric (tinct. op. camph.), of which I give a full dose, putting the child to bed after a warm pediluvium, and applying a warm mustard poultice to the throat. When this stage has passed by, however, and inflammation is fairly lighted up, the respiration is attended with a distressing struggle and a loud croak, and the peculiar cough, with its characteristic ringing sound, incessantly harasses the larynx, we must resort to other measures. An emetic is now demanded. While many prefer the antimonial, for its specific qualities in reducing febrile and inflammatory excitement, others regard ipecacuanha as especially expectorant, and others still resort to the sulphates of alumina, zinc, and copper, which act so surely and promptly, in order that no time may be lost in seeking relief from so much suffering.

Venesection is the next remedy to be spoken of. It is much disputed whether the use of the lancet should precede or follow the resort to vomiting; but I scarcely think it necessary to discuss the subject. In a very robust, plethoric child, when the attack was specially inflammatory with marked febrile excitement, it might be well to let blood without delay; but in general, bleeding is not only uncalled for, but injurious.

Nor can I even advise the topical bloodletting, so highly eulogized. Leeches annoy the little patient, and restrain the movements necessary in his eager struggles for breath. A warm mustard poultice may, instead, be applied from time to time to the throat and the neck.

If the child is not relieved by the first vomiting, place him in the hot bath, and repeat the emetic. Its action will be attended with more relaxation and expuition of the tenacious mucus from the air-passages, and its sudorific effect greater and more continued.

Having thus obtained a truce with the oppressive dispnœa, we next attend to the condition of the bowels, on which it will be well to act promptly by some cathartic; this will at once tend to reduce irritative excitement, and serve a good purpose as a revulsive.

Calomel is regarded by many practitioners, both in England and in our own country, as endowed with some beneficial influence of a specific nature, which adapts it to our present uses, and a large experience has accumulated many facts in confirmation of this opinion.

Some, with Dr. Potter, give it in large doses alone; some combine it, adding an antimonial or other emetic, to produce a double effect; some make it more promptly purgative by uniting it with rhubarb or castor oil. The saline cathartics, mingled in one of the sudorific or expectorant infusions, as, for example, in that of seneka or serpentaria, are now of admirable and acknowledged utility.

The polygala senega forms the basis of the hive syrup of Professor Coxe, and of the "anticroupal mixture" of Jadelot. It is an expectorant, if there be one; a sudorific also, and tends, in large doses, to keep up an occasional vomiting. The serpentaria possesses nearly the same properties in a minor degree of irritative activity. When croup is complicated with any visceral affection, or arises from gastric disorder, the mercurial will be found of great benefit, if, indeed, it be not essential to the complete relief of the patient. It may be usefully combined with Dover's powder, in doses properly adapted to the urgency of the case, and the age of the subject. The employment of opium has been strongly objected to by some of the authorities. I have already spoken of its remarkable adaptation to the incipient or invading stage, and regard it as also well suited, in the farther progress of the attack, after free depletion and full vomiting. The formula I have just mentioned, in which it is united to an equal amount of ipecac., is an excellent one and will effect much in behalf of the little sufferer under the circumstances pointed out. It diminishes the frequency of the distressing cough, and by determining strongly to the surface, checks the progress of pulmonary congestion and inflammation, and thus relieves the urgent difficulty of breathing, and gives opportunity for rest and refreshing sleep.

Squill and digitalis have been highly recommended for their nauseant, expectorant, and sedative qualities. I have some confidence in the former. The latter I have never employed here. Dr. Godman has in strong phrase eulogized the powers of tobacco, the Scotch snuff, which he advises to be laid in the form of a plaster upon the chest. It is uncertain whether it acts upon the skin or the nostrils, but in some it produces a relaxing and nauseating operation, which checks the progress of, and removes a mild attack.

The alkalies have obtained a very extensive and firm confidence in the domestic management of croup throughout our country. Common ley, made from wood ashes, a solution of an impure subcarbonate of potass, is frequently exhibited, and often with success. Some confide in the administration of the volatile liniment, oil and hartshorn being mingled, and given with some syrup or molasses. The influence of these alkalies I do not pretend to account for; the facts are perfectly well known. Some who believe in their specific effect prefer to medicate the baths, using warm ley water for the immersion of the sick. Among these domestic remedies, indigo was once in great esteem. It was prescribed in solution, or in powder diffused in water, in sufficient quantity to operate actively, both by vomiting and purging; when the relief procured by it is said to be immediate and lasting.

Should the case seem disposed to protract itself, and the remission of the troublesome and dangerous symptoms remain imperfect, or alternate with paroxysms of renewed violence, a very careful attention becomes necessary. The inflammation is exceedingly apt to encroach upon the bronchi and pulmonary tissue—a result which is to be feared, when we have much mucous râle in the lungs, with a loss of resonance on percussion, a pale or livid complexion, and gasping or panting. A blister should be put on the chest, large enough to cover a considerable portion of the surface. The emetic may be repeated, if the strength be not impaired; and it is best given while the child is in the warm bath. I never trust to the mercurial exclusively, but have often derived from it unquestionable advantage, under the circumstances now presented. On account of the very striking insusceptibility to the use of medicines so frequently met with in croup, it will be necessary to exhibit it in full doses. I have given from five to ten grains to a child little more than a year old, repeating it pro re nata; that is, until it freely moved the bowels. Dark colored, offensive, and ill-conditioned stools are thus brought away, either greenish or approaching to black, with decided amelioration of symptoms. I have repeatedly seen accumulations of undigested matters of some days' standing, forming part of these stools.

In the mean time, the use of the infusion of seneka or serpentaria, with some alkali in solution, may be continued. If occasional vomiting be still desired to relieve the trachea from collections of mucus, or in the hope of detaching and forcing away the shreds of false membrane or organized lymph, when it is formed, squill or ipecacuanha may be added. I am disposed, however, to prefer the sulph. cupri to all other emetics here.

Ware advises, under these difficult circumstances, "to avoid all reducing and disturbing remedies, and to keep the patient under the influence of opium and calomel, with resort from time to time to the local application of the nitrat. argenti." We owe to the courage and skill of Professor Horace Green the advantage of this additional resource and new ground of hope. With Rokitanski and Vouthier he regards the exudative inflammation as commencing uniformly about the fauces and upper portion of the respiratory tube. There it should be looked for, attacked and arrested, or it will inevitably progress downwards to a fatal result. The strong solution of nitrate of silver, that great "modifier of the mucous surfaces," as Ricord calls it, is to be applied directly to the larynx by a sponge filled with it, and passed into the glottis.

This topical medication has been fully carried out in France by M. Loiseau, who has invented an instrument for "catheterism of the larynx," which he urges as a substitute for tracheotomy. "His method is simple and infallible," says Trousseau, who recited to the Academy of Medicine, at Paris, several cases of croup and diphtheritis in which catheterism and cauterization had been successful, and concluded with the remark, that if this method did not "take the place of tracheotomy it should at all events be tried before practising that operation."

More recently M. Bouchut proposes the mere "*tubage*" of the larynx, and the "forced dilatation of the glottis" by the introduction of a silver tube or canula constructed for the purpose, through which air may enter and false membranes be expelled. This canula is retained by a special arrangement and allowed to remain in place from one to three days, until the symptoms of asphyxia cease to threaten. I can hardly imagine the possibility of the persistent presence of such a body in the glottis, however, without destructive irritation, although I might hope for immediate and temporary relief from its occasional insertion.

Dr. Reed, of Ohio, speaks of membranous croup in his region, as being most successfully treated by the employment of the ethereal solution of iodine, in the proportion of ʒj to ℥j, carried into the larynx by a sponge; the little patient being brought under the influence of mercury as soon as possible. (*Trans. Am. Assoc.*, vol. v.)

We should examine the lips of the glottis. Occlusion of this opening by œdematous effusion may occur, and admits of immediate relief by incision. Dr. Buck, of New York, has invented a very convenient instrument for this purpose.

If collapse threaten—the pulse sinking, and other signs of muscular and general debility supervening—I would have recourse promptly to the stimulant diaphoretics. The vol. alkali is particularly well suited, and may either be prescribed with oil as before mentioned, or in syrup. Camphor is also useful, and so is opium. The two are united in the tinct. op. camp., which deserves our confidence, and should be freely administered. Sinapisms should be applied to the extremities, and the powers of life supported by wine whey and wine.

I must not close the consideration of the treatment of croup without entering briefly into the question of the propriety and relevancy of bronchotomy as it is called, laryngotomy or tracheotomy.

The truth appears to me to be as follows: Croup is at first confined to the upper part of the windpipe—the larynx and adjoining trachea. If the rapid effusion of tenacious mucus which attends the invasion of the disease cannot be got rid of by the sufferer, or if the swelling of the lining membrane of the part be so great, whether by œdema or inflammatory congestion and tumefaction, as to occlude the opening of the glottis, or if the false membrane, so much talked of, be formed in mass sufficient to prevent the passage of air; if, under either of these contingencies, a sudden stop be threatened to the process of respiration, and the usual means of relief, promptly and freely applied, including the tube and sponge, be unsuccessful, then we are bound to resort to the operation. A patient should not be suffered to die of suffocation in an early stage of croup; an opening should be made in the windpipe for the admission of air. But we should satisfy ourselves, by a careful examination, that the impediment to breathing is confined to the larynx; the thorax should be resonant on percussion, and the respiratory murmur or loose mucous râle should be distinguishable. At the *Hôpital des Enfans Malades*, in Paris, out of 161 operated on, 36 were saved. Archambaut, Trousseau, and others, report instances of success.

But, in the more advanced stages of croup, the disease is no longer a local inflammation of the larynx and trachea. *Post-mortem* examinations prove it to have extended itself through the minutest ramifications of the bronchi and air-cells, which are gorged with mucus, or occluded with organized lymph, and even the pulmonary tissue has become solidified or "hepatized." This extension is inferred in the living subject, from the peculiar complexion, ghastly pale or livid, and from the loss of resonance on percussion, and respiratory murmur.

We have to contend with bronchitis and pneumonitis as well as laryngitis and trachitis.

Suppose the occlusion of the upper and large tubes capable of being instantly and totally removed, what will we have gained?

Bronchotomy is not, in any sense, a remedial means; it has no tendency to remove the inflammatory actions going on in the trachea, or to check their progress. By its success, we merely obtain time for the vigorous and persevering employment of the proper measures, and if these should be neglected or carried into imperfect execution, the extension of the disease into the lung will be as likely to occur, and to prove fatal, as if the operation had not been resolved on.

CHRONIC LARYNGITIS—*Laryngeal Phthisis*.—This form of disease has of late attracted much attention, and though it is not absolutely a new malady, as some suppose, is certainly more frequently met with in the last few years than formerly. It is known without difficulty. The sound of the voice is peculiar, or the aphonia is entire, the patient being able to speak only in a hoarse husky whisper, and with a painful and fatiguing effort. The larynx is the seat of uneasy sensations, and suffers when handled or pressed. There is a sibilant weak cough, usually dry and teasing; in some cases, there is expectoration of a thin tenacious mucus, sometimes of a little pus. Dysphagia is occasionally the most annoying symptom, from inflammation of the epiglottis. There is dyspnœa and much panting after muscular exertion. As the case progresses, the ordinary symptoms of phthisis supervene —emaciation, hectic, colliquative sweats, and diarrhœa.

Its *causes* are not clearly defined. It attacks far most frequently the scrofulous constitution. Clergymen are subject to it, especially such as *read* discourses in public. Its intimate connection with, or dependence upon tuberculosis is established.

Autopsy.—The local changes seen after death are, 1. Œdema of the glottis. 2. Inflammation of the mucous membrane of the larynx, with redness and swelling. 3. Ulceration of this surface, and of the epiglottis. 4. Ossification, caries, and necrosis of the cartilages. It is rarely fatal, however, without the presence of tubercular deposit extensively in the lung, and the supervention of pulmonary inflammation with its usual results; as described hereafter under the head of Phthisis.

Treatment.—In the first instance bloodletting, both general and local, may be demanded, with the application of poultices and sinapisms to the throat. Emetics are often serviceable in relieving paroxysms of dyspnœa. Mercurials are strongly recommended by Trousseau and Belloc in France, who urge them to the production of ptyalism, and by M. Hall in England. I have not derived much benefit from them.

Narcotics are always useful. The Dover's powder, if well borne, is to be preferred; the salts of morphine are among the best palliatives. They may be applied to blistered surfaces with benefit. Inhalations of vapor, simple and mingled with ether, camphor, chlorine, &c., have been recommended.

The nitrate of silver has been long in use as a gargle or local application to the fauces and pharynx, for the relief of the troublesome dysphagia, which it controlled better than any other remedy; but to Dr. Green belongs the merit of introducing it freely and efficiently within the larynx. He uses for this purpose a bit of sponge strongly attached to a stick of bent whalebone, the insertion of which, dipped in a solution of nit. argent. ℈ij to ʒj in aq. dist. ℥j, is productive of far less irritation and annoyance than would readily be imagined, and is in many cases followed by highly beneficial results. Its employment should always be fairly tried. Dr. Allison uses, in the same way, olive oil, glycerine, and mucilage, either simply or as vehicles for morphine, atropine, and conia, the application of which, he affirms, will very much relieve the patient.

Laryngismus Stridulus—*Spasmodic Croup.*—This is comparatively a rare disease, confounded under the same name, but very different in nature from croup properly so called. The dyspnœa, the only symptom common to the two affections, is in this transient, spontaneously subsiding, and recurrent, and accompanied with convulsive or spasmodic action of other muscles than those concerned in respiration. It attacks children almost exclusively—and for the most part while teething. The patient's thumb is turned in upon the palm with the fingers closed over it; the toes and instep bent backward, the breathing for a time suspended, suffocation seeming imminent; the eyes are open and turned upward; the nostrils dilated; the limbs and trunk rigid. After a short struggle, the attempt at inspiration becomes partially successful, and a series of sharp, sibilant catches precede the inhalation of a full breath, which is attended with a shrill sound, very different from that of true croup, but equally characteristic, described as "crowing" or clucking. The paroxysm lasts from a few seconds to two or three minutes; it is sometimes accompanied with general convulsions, and has occasionally proved promptly fatal.

I have had under my care an adult above 50 years of age subject to well-marked attacks of this character.

Its *cause* is found, we are told, in exposure to alternations of weather during dentition, and in gastric and intestinal disorder. It is supposed to depend upon reflex irritation of the 5th or 8th pair of nerves, the recurrent or some branch of the pneumogastric.

Autopsy reveals nothing to account for the symptoms.

The *treatment* consists in a careful attention to all obvious or suspected sources of disturbance. The gums should be scarified if swollen; the bowels kept gently moved by proper cathartics; and anodyne diaphoretics administered in moderate doses. The application of the nitrate of silver to the fauces, pharynx, and parts adjacent, is recommended on the ground that it tends to subdue any morbid irritability of the mucous surface, and the suggestion is reasonable and promising. Change of air is urged by Robertson as the true remedy and prophylactic.

BRONCHITIS.—Inflammation of the mucous membrane lining the trachea and bronchi occurs as acute and chronic.

Acute bronchitis resembles closely, in the first instance, an attack of catarrhal fever, from which it is then only distinguished by a more special prominence of the tokens of local and thoracic irritation and inflammation. Its access is usually with a chill, accompanied by a sense of soreness and stricture in the trachea, and a tickling, dry, and frequent cough; fever soon follows, with harsh, hot skin, flushed face, thirst, pain in the back and limbs. There is a loud mucous râle, and diffused feeling of rawness over the chest, the resonance of which is usually little, if at all, impaired.

These symptoms continue for four or five days; the cough and febrile excitement being somewhat increased at evening and in the night. Expectoration becoming freer, they subside gradually and disappear in a week or ten days.

But in some cases, as of old and infirm persons, a sort of collapse of the lung or a portion of it takes place from occlusion of the air-tubes probably by the great amount of thick tenacious effusion. Here we shall notice an extending dulness; the dyspnœa is urgent, with a distressing tension across the chest, and much pain in coughing. The patient cannot lie down; oppressed with the accumulating mucus, he cannot expectorate. If these symptoms be not promptly relieved, he may sink exhausted by his struggles; or the expectoration becomes somewhat freer and fuller, and the disease subsides, or passes into a chronic condition.

Post-mortem examination shows the submucous tissue of capillary vessels highly injected, the tubes and air-cells being filled with a secretion of varied appearance, sometimes a tenacious ropy mucus, again a thick, purulent fluid, mingled occasionally with a serous, ichorous, or sanious effusion. The substance of the lungs partakes of the results of the inflammation if protracted, and becomes more or less solidified, or, as the phrase is, hepatized.

Cause.—Exposures to cold, moisture, and alternations of temperature, are familiarly known to produce bronchitis. It has been excited by inhalation of some of the irritating gases. It is more frequently met with among persons engaged in certain occupations, millers, cotton-ginners, needle-grinders, &c.

The *prognosis* is readily inferred from the degree of dyspnœa, and the apparent ability of the patient to struggle with the impediment to his breathing, and to bring out from the air-passages the offending mucus. Free expectoration is, therefore, favorable, and a hard, dry ringing cough the reverse. Very old and infirm persons, and young children suffer the most serious risks.

Treatment.—Venesection is in some cases an indispensable remedy, and must be promptly carried to as great an extent as can be borne without injury. Emetics are serviceable, both as expectorants and diaphoretics, and are peremptorily demanded in the cases of infants, and the very aged. They may be repeated from time to time. Ipecac., squills, and seneka are preferable; if these are not sufficiently active, tart. antim. may be added. Cathartics are useful. I select the saline, and combine them with diaphoretics, as the infusion of serpentaria or seneka. Much has been said against the employment of cathartics in thoracic diseases; but these objections are speculative; experience shows them to be, in the early stages, not only safe, but admirably beneficial. In the advanced periods of such cases, they are not required, but the bowels should be kept regular and soluble throughout. Nauseating doses of antimony are much extolled. I am not fond of the practice, but prefer to use the veratrum viride to reduce the undue force and rapidity of the circulation.

When the febrile excitement is in some measure subdued, opium is an invaluable medicine. Dover's powder is a good combination to insure its effect as diaphoretic and anodyne.

Of topical applications, after cupping I prefer the warm poultices, with which I envelop the throat, and cover the chest. Leeches imply too much exposure.

To relieve the cough, demulcents are required; mucilaginous solutions, with opium, form the basis of the most valuable of these. Spermaceti, so often prescribed formerly, is now too much neglected. Rubbed into powder, with equal parts of loaf-sugar, and one-fourth of the nitrate of potass, taken into the mouth, and allowed to dissolve slowly, it is well adapted to relieve a teasing, frequent cough.

The apartment should be kept comfortably warm, and no current of air allowed to pass over the body of the patient.

In the asthenic bronchitis of the old and infirm, the peripneumonia notha of writers of the last age, stimulants and stimulating diaphoretics are demanded early, and must be given freely. On account of the enormous secretion of mucus into the air-cells and tubes a quick undepressing emetic may be now and then required. Prof. Meigs' expectorant formula is well adapted here as in the cases of young children. ℞.—Hydrochlorate of ammonia grains viij to xij, water oz. ij, with a little tinct. opii and liquorice. Of this, a child may take a teaspoonful, and an adult a tablespoonful *pro re nata.* The carbonate of ammonia and camphor, with or without a few drops of chloroform, will also tend to relieve the cough and render expectoration easier.

Opium must be prescribed with caution if at all. The strength must be supported with wine-whey, wine, &c. We cannot detract blood from such patients, but dry cupping will often be of service—the mustard poultice should be applied, and here, also, blisters will be found well adapted.

Chronic bronchitis is usually a consequence of the acute form, but may occur as a primary affection, in which case it is developed slowly and insidiously. There is cough, with slight soreness of the trachea and thorax, a sense of stricture and tightness, increased on drawing a deep breath; the voice is somewhat hoarse. The cough becomes more harassing and severe; the expectoration, at first scanty, increases in amount, and changes from mere mucus to muco-purulent consistence, sometimes colored with a little blood. In a few cases hæmoptysis may happen, but this is not frequent. Respiration is hurried, and panting attends any muscular exertion, or the ascent of a stair. The pulse is tense and frequent, and a febrile exacerbation shows itself at first in the evening, going on to a full development of hectic, with night-sweats, emaciation, and great loss of strength, diarrhœa, &c.

Autopsy.—The bronchial mucous membrane is high colored and thickened, and occasionally eroded with ulcers. The lungs are found hepatized or solidified, the air-cells and tubes filled with muco-purulent matter, mingled with a frothy and bloody serum.

Prognosis.—The unfavorable indications are chiefly drawn from the degree of dyspnœa in the early stages, and at a late period from the atrophy and emaciation which waste the patient. An extreme frequency of pulse is unfavorable. Panting also, and paleness or lividity.

Diagnosis.—The distinction between chronic bronchitis and tubercular phthisis is sometimes difficult. In the latter, there is more dulness, less râle, less soreness of the trachea and thorax, more tendency generally to hæmoptysis, and less expectoration in the early stages. In their advanced progress, we can draw no line between them, except from their previous history. Hence the phrase "Catarrhal Phthisis."

Treatment.—The lancet is rarely required. Leeches may be applied to the throat, and cups to the chest, with benefit. Dry cupping the thorax is useful, as a revulsive. Emetics are much confided in, and great stress laid on preference due to particular articles. Ipecac. is generally chosen; some combine it with tart. antimon., and others with the sulph. cupri. The utility of emetics is unquestionable; they are expectorant, diaphoretic, and, in most instances, move the bowels sufficiently. To soothe pulmonary irritation, and keep up a constant determination to the skin, we may exhibit a combination of the nitrate potass. with Dover's powder, allowing a full dose of anodyne nightly, at bedtime. A choice of the numerous preparations from opium may be made to suit each particular case. I do not think any other of the narcotics, as the lactucarium, hyoscyamus, &c., entitled to our confidence. The digitalis or the veratrum viride may do service when the pulse is particularly frequent. Squill is highly prized by some as an expectorant.

The infusions of serpentaria and seneka afford good bases for the mucilaginous, demulcent, and anodyne solutions, administered to relieve the troublesome cough. In threatening cases, I would advise an alterative mercurial course. Calomel, in small doses, or the blue pill, may be so given as to produce highly beneficial results, while it should not interfere with the proper employment of such other remedies as may be demanded. Inhalation of various airs and gases, the vapor of ether, in which conium has been macerated, that of burning tar and of resin, iodine and chlorine, have been extolled.

The several balsamics were formerly much in vogue. Myrrh, tolu, and copaiba, are the best of them. "Pine-gum pills," and "lightwood rum," are common domestic prescriptions, in the south and southwestern States. Naphtha is advised. Cod-liver oil is still in repute.

Tonics may be made of great benefit, by a proper selection of the period for their exhibition, and the cases to which they are adapted. I would use them when the tokens of muscular debility and general relaxation were more prominent than those of local irritation, or febrile excitement. The infusion of cinchona with mucilage, is lauded by Broussais and Hastings. The elixir vitriol and tinct. mur. ferri are prescribed as serviceable in restraining nocturnal sweats.

The persevering application of counter-irritants to the chest and arms will be of great advantage. I prefer to blister successively one and another portion of the surface. The tartar emetic is a favorite irritant with many physicians, while others still prefer setons and caustic issues.

The convalescent must take as much exercise in the open air as he can undergo, without fatigue. A long journey, or a sea voyage should be advised, and an equable climate chosen.

PLEURITIS.—Inflammation of the serous investing membrane of the lungs is a common and well known disease, usually met with in winter and spring, and frequent in occurrence in proportion to the abruptness of the changes of the weather in these unsettled seasons. It comes on with sharp pain in the thorax, at the side, and most often, perhaps, on the right side; the pain is fixed and circumscribed, constant, but increased by a full inspiration; the breathing is short and restrained, and the patient assumes a bent posture, leaning to the affected side. Fever soon supervenes, with quick, frequent, hard, and full pulse; the skin is hot and dry, and a cough comes on, aggravating intolerably the keen lancinating pain.

If not soon relieved, the dyspnœa increases, and the symptoms of pulmonic inflammation are added, and become prominent; or the case is protracted into a chronic stage, in which the results of the inflammation of the pleura vary somewhat. Effusion takes place within the cavity of this membrane, which exhibits itself by the continuance of dyspnœa after the earlier acute symptoms have subsided; it is aggravated into orthopnœa, more annoying when the patient sleeps, and during the night. The affected side becomes fuller to the eye, and does not follow the ordinary movements of respiration; there is not only a total absence of resonance on percussion and respiratory murmur, but the heart itself is sometimes displaced by the accumulated fluid, if on the left side, and pressed over to the sternum and upwards;

and all the phenomena detailed in the description of hydrothorax supervene.

The *causes* of pleurisy are already pointed out; exposure to cold and moisture, and sudden changes of temperature. External violence too may give rise to it; puncture by the spiculæ of a fractured rib has occasioned it; and a fatal case is on record where the pleura was wounded by a needle employed in passing a ligature round the subclavian artery.

The *diagnosis* of pleurisy is not difficult. The pain in the side is attended at first, if the case be uncomplicated, with little impairment of resonance on percussion; the respiratory murmur is only deficient because the patient does not inspire freely. After a short time, the "frottement" sound is heard, produced by the rubbing together of the opposite surfaces of the pleura, roughened somewhat by the exudation of plastic lymph, or fibrinous shreds. The case still advancing, effusion of serum gives a brief ægophony; this is followed by great dulness of resonance, varying somewhat with the posture of the patient, and corresponding loss of respiratory murmur, owing to the still increasing amount of fluid only, if the case continue a simple one. But in fact it is apt to complicate itself into *pleuro-pneumonia*, the superficial inflammation extending to the tissues beneath; when we shall have of necessity the symptoms of pneumonia vera added to those above enumerated.

Prognosis.—In general, pleurisy may be regarded as a manageable disease, attended with little danger, if the patient is seen early. In the first stage, the danger of risk may be inferred from the extent of the inflamed surface, the violence of access, the severity of the constitutional excitement supervening, and the apparent ability of the patient to bear the requisite remedial measures. As the case progresses, the increase of dyspnœa into orthopnœa is unfavorable. All tokens of effusion are of course to be dreaded. This is shown by dilatation of the side of the chest affected and protrusion of the intercostal spaces. Adhesions of the pleura, on the contrary, give rise to contraction, flattening, immobility, and lateral curvature.

Autopsy.—The most common result of inflammation of the pleura, often indeed observed in bodies dead of other forms of disease, is the adhesion of the opposite surfaces of the pleural sac, or their connection, by layers or strips of organized membrane. Effusion of pus, *empyema*, is occasionally met with; that of serum is far more frequent.

Treatment.—The lancet, used promptly and boldly at the outset of the disease, will often put an end to it at once. It is to be resorted to at all stages while the breathing is sharply painful and difficult, unless the pulse is feeble, and the strength of the patient obviously failing.

Topical depletion by cups, which should be applied on and near the seat of pain, is next proper; after which, large warm poultices should be assiduously laid about the side. A full and free dose of an anodyne diaphoretic will now complete the relief of the patient, who sleeps soundly, breathes quietly, and wakes restored to comfort. Dover's powder is perhaps preferable here to any other formula.

If the attack be protracted, cathartics will be found useful, and the drastic and somewhat irritating should be chosen as most revulsive. No prejudices have less foundation than those which oppose the employment of purgatives in thoracic inflammation. They are adapted, however, only to the early stages of febrile character in young and robust subjects. It is advantageous to combine them with an antimonial or other diaphoretic, as in the common formula of nitrate potass., pulv. jalap. et tart. antimon. I have seen little or no benefit from the exhibition of emetics, so highly recommended by some practitioners. Among the vegetable diaphoretics, the infusions of seneka and serpentaria, and of the asclepias decumbens (vulgarly called "pleurisy root"), are deservedly extolled. The combination of ipecac. with opium in the pulv. Doveri is an invaluable remedy; a full dose of it, twelve to twenty grains, should be given nightly, and it may be usefully added at regular intervals to such other medicines as are prescribed during the day. Demulcent drinks, rendered more efficient by the addition of tinct. op. camph., tinct. tolut., and nitrous or chloric ether, may be taken to palliate cough.

Epispastics should be applied over the affected part of the chest, if any pain should continue after the febrile excitement has been subdued, and the pulse has lost somewhat of its force and tension. This abatement of inflammatory irritation constitutes the "blistering point" of English writers. Empyema or hydropleura may demand the operation of paracentesis, to relieve the patient of the otherwise fatal accumulation of serum or pus.

Some recent writers recommend an early resort to the operation of paracentesis, even in acute pleurisy, and as soon as effusion in any considerable amount has taken place. The suggestion appears to me to be reasonable and promising, and many cases have already been reported in favor of it.

Bilious Pleurisy.—In all low miasmatic regions, the thoracic affections of spring and early winter are apt to be combined with, and modified by, notable symptoms of gastric and hepatic disorder. This complication, known familiarly by the title just given, I am disposed to attribute to the persistent effect of malaria upon constitutions imbued with that poison; an English writer of some authority speaks of it as owing to an undefined atmospheric and epidemic influence still present and acting.

In this form of the disease, which is by no means rare in the southern country, less vigorous depletion by the lancet is required or admitted of, than in simple pleurisy. Emetics are more beneficial; cathartics indispensable; and mercurials more applicable. The sulph. quinine is used with advantage, after the very first stage has passed. Vesicatories are well adapted, and may be applied early.

Convalescence requires great care and prudence. The clothing should be warm, and all exposure avoided.

Pneumonia—Pneumonitis—Pulmonitis—is the inflammation of the substance of the lung—its parenchymatous and cellular tissue.

Recent pathologists have made some difficulty about its ultimate seat, and showed a disposition to confound it with bronchitis. But the interstitial or intervesicular tissue, though it does not absolutely escape either in pleurisy or bronchitis proper, either in inflammation of the investing serous tunic or that of the internal lining mucous membrane, is subject to its own special affection, which we now proceed to treat of. They, in turn, participate in its inflammation, and we have few cases of pneumonia so exclusive as, on the one hand, to evade some complication with bronchitis, an extension indeed almost unavoidable, in greater or less degree, and on the other with pleurisy, constituting a pleuro-pneumonia. Here the whole mass of lung substance is involved. The right lung is the one most frequently attacked; the lower portion of the middle, or the upper half of the lower lobe, the special locality; in about one-fourth or one-fifth of the cases, both lungs are attacked—*double pneumonia.*

This is one of the most frequent of our diseases, a large and familiar outlet of life. It is oftenest met with in winter and spring, but occurs in all seasons of the year. It assails all ages—infancy, maturity, and the decline of years. When it affects the whole lobe of a lung diffusedly, it is spoken of as *lobar;* thus it appears in the adolescent and adult. In children below six or seven years of age, it is less extensive in the parts it attacks, though it may show itself in several spots in the lung, and this circumscription is intended when we speak of *lobular* pneumonia. In the adult it is often primary, but not unfrequently secondary, supervening in the course of other diseases, as in typhous and other fevers, in smallpox often. Children of tender years are very liable to this secondary pneumonia, which is often latent or masked by the original malady. In all febrile attacks to which young children are subject, in winter and early spring, it will be well to examine and guard against this secondary annoyance. It follows croup, catarrh, bronchitis, hooping-cough, and many other ailments, belonging, indeed, to the history of the exanthemata.

Pneumonia is essentially pyrectic, and the fever may be either of open and high excitement, or of low type, either inflammatory or typhous. In all malarial regions we are familiar with the complication known as bilious pneumonia or bilious pleurisy, in which the fever exhibits periodical form, and the other characteristics which mark our autumnal remittent.

Cause.—It seems to be among the most direct and usual effects of exposure to cold; moisture aids this effect. It follows, also, the impression of marked alternations with prevailing low temperature.

Symptoms.—Pneumonia comes on often with a formed rigor or chill, which soon passes away, leaving the patient hot and flushed, with some dyspnœa, and a sense of uneasiness and oppression in some part of the chest. This soon increases to pain, which is usually dull rather than sharp, with augmenting difficulty of breathing, oppressive rather than severe. It is not easy to draw a long breath, but the attempt is not suddenly checked by a keen pang, as in pleurisy, nor restrained by an extended feeling of soreness, as in bronchitis. The pulse becomes frequent, full and hard; and in proportion to the degree of attendant fever, is the general or constitutional disturbance. There may be headache, with pains in the back and limbs, and nausea even to vomiting. Cough soon attends, at first dry, but afterwards with expectoration; its sound is peculiar; not abruptly suppressed like that of pleurisy, nor vehement like that of bronchitis, but anxious and unsatisfactory. The sputa are colorless at first, or slightly yellowish, and semi-transparent; often so viscid that the vessel receiving them may be inverted without their flowing out. They soon begin to exhibit bloody striæ, then become of reddish or brownish color throughout, or of brownish yellow hue, like tobacco juice, or still darker in rare and bad cases, like prune juice. In the progress of ordinary cases, there may be mingled or substituted a creamy or frothy matter, muco-purulent or sero-purulent. Sometimes there is a thin sero-sanguinolent, pink-colored or darker fluid brought up, extremely offensive; this usually indicates gangrene, though perhaps not uniformly.

Physical Signs.—These are of great importance to be attended to, as in combination with the general and rational symptoms above enumerated, showing clearly enough the actual condition of the patient. At first there is slight dulness, or loss of resonance upon percussion, more perceptible, usually, below the point of the scapula, behind or at the side, and the vesicular murmur is feeble; a crepitant râle is heard, like the sound given on passing a lock of hair between the fingers; the dulness increases and the râle disappears; the respiration is blowing, and bronchophony obtains; when purulent matter is spit up, we hear the mucous râle, or a gurgling; there is restored resonance on percussion, but not the respiratory murmur; if a cavity is formed, pectoriloquy will show itself; if the patient begins to convalesce, these sounds will take a returning or retrograde course, and the crepitant râle will precede the restoration of the natural vesicular murmur.

Anatomical Changes.—The first stage is one of mere pulmonary *congestion*—a stasis of the blood, a hyperæmia, or hæmal infiltration, scarcely to be distinguished from the turgescence of the lung in the moribund; doubtful whether it differs from the state called "pulmonary apoplexy," in any definable manner. Next, we have the stage of red softening, in which the tissue, filled with blood, is somewhat friable and yielding; *splenization*, as it is termed, seems to me to be more significant of the condition which is, however, perhaps too transient to be often met with in post-mortem examinations; then comes the *hepatization*, so familiarly recognized, in which some of the more fluid parts of the blood are removed; the lungs are heavy, a little firmer, solidified; when cut or torn across, show a red color, and a granular structure, and sink in water. The cell walls are thickened, and lymph or fibrin deposited within the cells and tissues. After this there is a grayish discoloration, by purulent infiltration, diffused abscess, as some have called it. Most pathologists agree that circumscribed abscess is very rare as the result of pulmonary inflammation. I have met with it, unless I mistake, much oftener than the proportion they speak of. Laennec tells us that in several hundred examinations of bodies dead of pneumonitis, he met with "pus collected in an abscess, in not more than five or six." Andral saw but four such cases in all. Chomel had but three in a practice of twenty-five years. In an experience somewhat longer, with but few deaths from pneumonia, I have examined two marked cases of circumscribed abscess, where the lungs presented no tubercles remaining, and, therefore, I was not likely to fall into the suggested mistake of taking for simple abscess a tuberculous cavity; and I think I have diagnosed several cases of pulmonary abscess, in patients who recovered. I am pleased to have with me the weighty authority of Graves, who contends that "circumscribed abscess occurs more frequently in the pulmonary tissue than Laennec allowed, or his followers seem willing to believe." He has published six cases of recovery from such abscess in his own practice, and that of his friends. When the inflammation in the lung is lobular, or in any way circumscribed, I cannot imagine why the subsequent deposition of pus may not be so too; the tissue is already solidified.

In lobular pneumonia, which is much the most common in young children, but does happen in adults, also, the inflammation of the affected points is surrounded by healthy tissue. If the case is to progress to an unfavorable issue, these healthy patches become involved; but there can be no reason why, in a certain set of cases, the diseased points may not go through the changes above described, locally, or in an insulated way.

Among the changes which go on in the lung, one has been called *carnification*, as presenting an appearance like muscle. It resembles flesh beaten and crushed, as for purposes of cookery; "is red, flaccid, unaerated, is torn with difficulty, and when its cut surface is pressed, nothing but a little blood exudes." Watson describes just such a condition as occurring sometimes in bronchitis. He says "there is collapse of the lung. It is carnified, looks like a piece of muscle, is firm, dry, tough, dull red and sinks in water."

Gangrene of the lung is enumerated among the consequences or results of inflammation. It is true that it is seen usually or always in connection with pneumonia; but I have never been satisfied that it occurred in the part inflamed. In the very few instances that I have known, the gangrenous spot lay beyond the point of consolidation, and seemed to me to have perished from obstruction to the circulation of the blood in the vessels which supplied it, and which passed through that part. In its most common form, gangrene is described as a greenish-black mass, containing ash-colored portions of dead cellular tissue, soft and spongy, and of a horribly fetid odor. Swett speaks of a "softening of the lung sometimes met with, which resembles very much gangrene in appearance, but wants entirely the characteristic odor. The part affected is soft and moist, breaking down by slight pressure into a pulp of a dirty brown, or blackish, or grayish color." I have never seen such a condition.

Diagnosis.—It does not seem to me that this can be difficult in an uncomplicated case in an adult. A careful collation of the rational symptoms and physical signs, and observation of the special succession in which they take place, will leave little or no room for mistake. In bronchitis, which sometimes, perhaps, resembles pneumonia, and is often mixed with it, we have no crepitant râle, no definite dulness, and the peculiar rust-colored expectoration does not show itself.

The lobular pneumonia of children is not so easily distinguished. The separation of the inflamed spots from each other, with healthy patches giving out normal sounds between; the restlessness of the little patients ordinarily under physical exploration, and the fact of its usual secondary character, or complication with precedent disease, which so often masks it in greater or less degree, account for this. I always suspect the supervention of this condition, however, when the respiration of the child is greatly hurried and shortened, the pulse specially frequent, with a circumscribed red flush on the cheek. It is more likely to take place, too, in cold and wet weather.

From pleurisy we distinguish pneumonia when they occur separately by the kind of pain, oppressive rather than acute, the crepitous râle, the absence of the rubbing sound, and by the fact that the dulness on percussion is never so great as that which results from pleural effusion, is less permanent, and does not change its position with the changing posture of the patient.

The *prognosis* is, in general, favorable. We shall find the proportion of reported recoveries large under all modes of treatment, and under no treatment at all. The *médecine expectante*, the management by regimen alone, without active measures, gave very pleasant results in the hands of Grisolle and Magendie; and the homœopathists have uttered loud boastings as to their success in Vienna and elsewhere, with the infinitesimal doses of various articles of their imaginary materia medica.

Many respectable authorities on both sides of the Atlantic, abjuring all ordinary active or heroic treatment, represent the disease as yielding readily, and proving generally amenable to gentle measures. An examination of the bills of mortality everywhere published will show, however, notwithstanding all this, that pneumonia holds a high rank on the list of the known causes of death in civilized communities.

There are other contingencies, too, which deserve to be considered besides the mere ratio of deaths. The probable duration of the attack; the degree of suffering through which the patient must pass to recovery or the fatal issue; the completeness or incompleteness of his restoration, and the prospect of longevity and of resumed capacity for action and enjoyment belonging to convalescence; these are important points destined to be influenced by our views of the nature of the case, and by the treatment which we shall be led to institute.

In young and previously healthy subjects, seen early, and placed under conditions of comfort and proper attention, if the fever be of ordinary type, the pneumonia single, or of one lung, and especially if limited to small space, and at the base of the lung; if the dyspnœa be not specially great, nor the pulse excessively hurried; and if expectoration, coming on pretty early, be easy and full, the prospect is favorable. Even gangrene of the lung is far from being uniformly fatal. On the other hand, in very young, old, or debilitated, or intemperate subjects, in double pneumonia, or extensive inflammation, with great dyspnœa or orthopnœa, with pulse from 130 upwards, if the fever be of typhous character, if there be delirium with restlessness and muttering, we augur unfavorably. When the complexion becomes livid, or exceedingly pale, the lips and tongue of dark hue and dry, with aphthæ or diarrhœa, the patient is in great danger. . Death may happen at once and suddenly, from congestion or hæmal infiltration, the pulmonary apoplexy of some writers, as shown by intense oppression and apnœa, lividity, and asphyxia.

In ordinarily fatal cases, the patient dies in the third stage, or that of hepatization, perhaps about the fourteenth or fifteenth to the twenty-fifth day. Recovery takes place by resolution about the tenth, with freer expectoration, which grows lighter colored and less bloody, with easier breathing and return of crepitant râle. It happens after purulent infiltration also, at a later stage, and I think not unfrequently, if the subject have retained his strength, and is able to cough up and get rid of the matter thrown out into the cells and tubes of the respiratory apparatus.

I saw, in 1849, a recovery from double pneumonia, with an extraordinary accumulation of unpleasant symptoms; pulse 150, orthopnœa, low muttering delirium, a frothy muco-sanguinolent expectoration, mingled with offensive pus; commencing about the twentieth day, and going on to the restoration of entirely good health.

Beale, Simon, and others dwell upon the diagnostic and prognostic value of the presence or absence of chlorides in the urine. The chloride of sodium, always present in that excretion in health, "disappears," says Bennett, "during the onward progress of pneumonia, and returns to it when absorption of the exudation is about to commence."

Treatment.—Venesection is a remedy specially adapted to the contingencies of this formidable disease, as it usually presents itself. Denounced as altogether uncalled for, by J. H. Bennett, its importance is scarcely exaggerated by Bouillaud; greatly underrated by Louis, and by no means sufficiently dwelt on even by Bartlett, in his elegant *Essay on the Certainty of Medicine*. In the early stages—in the first, second, third, or perhaps the fourth day, it can scarcely ever be proper to omit it. A large orifice should be made in the largest convenient vein in the arm, the patient being in the semi-erect position, and a full flow promptly obtained. The breath should be more freely drawn, the pain should be lessened, or the pulse brought down nearly to the point of syncope before the arm is tied up. If the subject be young and robust, the bleeding may be repeated as soon as the pain and dyspnœa return, perhaps twice or thrice in the twenty-four hours. I am surprised at the hesitating manner in which a large proportion of modern writers speak of the effect of this measure. I am very confident that I have many times thus arrested the disease in its forming stage, and that my patient has at once begun to convalesce. This, however, will only happen when he is seen within the first few hours. After but a short time, a morbid hæmostasis becomes established too firmly to be thus resolved. A few hours more, and infiltration—hæmal infiltration will have occurred; upon which consolidation, hepatization will soon follow. Much less immediate benefit is now likely to accrue from V. S. But at any period while there is pain and dyspnœa, with good pulse and strength, the lancet may be employed with advantage. It gives almost unfailing relief in greater or less degree, and is highly useful too in preparing the system to receive the benefit of the farther necessary treatment. I need not say that cases are met with in which it would certainly do more harm than good. In advanced life or early infancy, in greatly debilitated subjects, when time has been lost and the strength impaired, when the associate fever is of low type, or the case is secondary, and the subject exhausted by previous disease, it must be abstained from. Topical bloodletting by leeches and cups, however, present very little risk, and while demanded in the common contingencies, are well suited to doubtful cases. Dry cupping is a good revulsive when we cannot venture even to use the scarificator or the leech.

Nothing is better established than the impressive efficacy of antimonials in pneumonia. Large doses are given, as large as the stomach will bear, for it is not supposed to do its best service, if it either prove emetic or purgative. Laennec gave eight or ten grains during the twenty-four hours, a grain being given every two hours in eight consecutive doses; and this plan is followed and recommended by many still. To obtain a complete tolerance of the drug, which is not always easy, opium is added by some in sufficient amount to keep the stomach quiet; and thus, patients have been made to bear from ten to fifteen grains, or even more.

Others, differing entirely in their views of its appearance, urge it to vomiting and purging, and free diaphoresis, thus procuring prompt and impressive reduction of vascular excitement, local and general.

While I acknowledge the efficiency of this practice, I confess some fears of its peculiar results. Antimonials irritate and depress; sometimes the one mode of action being prominent, sometimes the other; and it has been alleged that deaths have occurred in both modes under this heroic treatment. I have sought to procure its advantages with less risk by the administration of smaller quantities than those mentioned above, which few of my patients have been able to bear. It is easy to keep the pulse lowered, the patient a little nauseated, and the skin moist, with a fourth or half a grain every hour, or two or three hours; and this I have found unquestionably beneficial. But I prefer to substitute other sedatives, relaxants, and diaphoretics, whose action is less annoying, and safer. To a pretty strong infusion of rad. serpentaria or seneka, ℥viij, I add ʒj of ipecac., rubbing it uniformly in the infusion with tinct. opii, gtt. xxx. Of this mixture, the patient will take a tablespoonful every half hour until he becomes affected with nausea, which may be kept up at our discretion by doses administered *pro re nata.* I have seen much relief given in this way, and, as yet, no evil inflicted.

The veratrum viride may also be employed as a substitute for the antimonial; the dose to an adult male is seven or eight drops every two or three hours, diminishing rapidly the quantity relatively to sex and age. I am persuaded that I have seen it—as I have seen the lancet—cut short the disease abruptly, and cause it to *abort*, as the phrase is. Dr. Branch agrees with Dr. Norwood, to whom we owe its introduction here, in regarding it as "invaluable in pneumonia." In smaller doses, "it is," they tell us, "eminently expectorant." It must be used with some caution; yet I have come to regard it as equally efficient with tartar emetic, and far more manageable.

There are still many physicians who prefer, after bloodletting, to rely on the less prompt, but less insecure, and older methods of management. A saline purgative, with some diaphoretic infusion, is given, and when the bowels are opened, they are kept soluble by the regular exhibition of small doses of calomel—perhaps combined with the nitrate of potass. and ipecac., as sedative and sudorific. This is, undoubtedly, an excellent course. We thus determine from the inflamed organ to the bowels and the skin, and act on the blood in a beneficial manner, probably by diminishing its plasticity and hyperfibrination. A few press the mercurial to the extent of a light ptyalism; but this is rarely necessary.

Opium is a remedy which I am never able to dispense with. From the very beginning, I prescribe it in free doses at night, giving to an adult, of Dover's powder from ten to fifteen grains at bedtime, to be repeated at midnight if he is restless. Throughout the day I combine it in smaller quantity with whatever other recipe he is taking. It is our best demulcent, diaphoretic, sedative, and tranquillizer. It is contraindicated only in the rare complications of cerebral disorder and congestion.

Some of the German physicians have been treating pneumonia with chloroform, and it is said that the results are favorable. I would not hesitate to allow the patient to inhale it whose expectoration was insufficient, and his cough teasing and frequent. But I would watch its action carefully. The muriate of ammonia is affirmed to possess peculiar powers as an expectorant. The carbonate is often employed in the latter stages as a cordial and stimulant of known value.

The patient must be supported in a protracted attack by proper and nourishing food, and tonics, and stimulants. Infusions of cinchona with serpentaria and the camphorated tincture of opium, sustain his strength, and relieve his cough, and other annoyances.

Local measures of relief must not be neglected. After topical bloodletting, large warm poultices should be kept applied over the part of the chest where the inflammation is seated. As soon as the force of febrile irritation has been reduced—the blistering point of the older writers—an epispastic should be applied over or near the same spot; and this application should be repeated from time to time until the disease is subdued. Meanwhile the chamber should be kept warm and comfortable, and all proper shelter from exposure carefully arranged for the sick man.

In carrying out the treatment thus briefly rehearsed as applicable generally to all the familiar varieties of pneumonia, allowance must be made for the modifications indicated by circumstances, and by varieties of condition. We must remember that children do not bear, or require free venesection as adults do; and in their cases, chiefly secondary, it will not often be necessary to resort to it at all. A mild but efficient purgative, followed by small doses of calomel, with ipecac.

or Dover's powder, with poultices, and occasionally a blister to the chest, will, in a very great majority, give the desired relief. In the black race, too, the lancet must be used with reserve; and stimulants promptly administered to arrest the typhoid tendency to which, in them, all the phlegmasiæ are so prone.

BILIOUS PNEUMONIA, like bilious pleurisy, being an inflammatory affection, complicated with periodical or malarious fever, will demand more active purging, a freer use of mercurials, and an early combination of the sulphate of quina with such other remedies as may be administered. It is affirmed by Boling and others, whose experience with it has been extensive, that in any ordinary dose, or even large quantity, its effect is unequivocally specific, and of the most salutary character. Prof. A. B. Palmer has also expressed in one of his able essays a strong confidence in the safety and benefit of its employment in such cases.

CHRONIC PNEUMONIA.—*Apostematous Phthisis.*—Dr. Duncan long since divided Phthisis under three heads. 1. Catarrhal consumption —chronic bronchitis; 2. Apostematous consumption, our present subject; and 3. Tubercular consumption, which shall be treated of next in order.

Chronic pneumonia with abscess is not so rare a disease as it is represented to be by Laennec and others. It is a sequel of acute pneumonia not unfrequently, and may follow catarrhal fever and bronchitis. I have seen it twice occur from gunshot wound of the lung; in one case it was fatal after some months; the other recovered from a protracted illness of more than a year. Wounds of the lungs, however, often heal kindly and readily. It may supervene upon asthma, and result, as we are told, from tenacious gastric and hepatic derangements, constituting the "Dyspeptic Phthisis" of Wilson Philip. Hæmoptysis has been affirmed to produce it, but is, I believe, only a coincident effect from the same cause when they occur in connection. Some of the exanthemata, as smallpox and measles, have brought it on; and it has followed the suppression of itch and other cutaneous eruptions. It belongs to the history of some mechanical occupations; above all others the needle and scissors grinder, the coalman, the miller, and the cotton ginner. The mechanical irritation of the particles of matter inhaled, accumulated, and impacted in the lung, cannot fail to arouse inflammation with tendency to the formation of abscess.

This event is attended by a fixed, heavy pain in some part of the thorax, pulsatory for the most part, at intervals sharp and lancinating. There is dyspnœa, which does not admit of muscular exertion, and is increased also on lying down. The cough is severe, but at first without expectoration. Fever is present with thirst, and heat and dryness of skin increased in the evenings. When suppuration occurs, chills supervene, at first irregular, but afterwards regularly periodical, and the hectic character of the fever is marked.

The pus secreted is sometimes expectorated gradually in increasing amount, but now and then an abscess bursts suddenly and discharges its contents, perhaps with danger of suffocation, matter being coughed up in quantities varying from ounces to pounds. There is great relief at the time, and the expectoration continues for awhile easy and abundant, consisting of pus mixed with mucus, and sanious serum.

Recovery sometimes happens at once from this state. More generally, perhaps, there goes on hectic fever with progressive emaciation and great debility; the voice is weak and hoarse; the pulse tense and quick; the expectoration abundant and offensive, and colliquative sweats and diarrhœa terminate the tedious train of sufferings. The digestive system, which in many remains unimpaired until the last stages, in some begins to be affected from the first, with dyspepsia, diarrhœa, redness and aphthous ulceration of the lips, cheeks, gums, and tongue.

Autopsy shows occasionally the presence of circumscribed abscess sometimes involving a whole lobe, or large part of one. At other times there are two or three smaller cavities, lined by a false membrane or layer of tenacious fibrin; around which, and in contact with their parietes, the tissue of the lung is solidified, hepatized. Masses of coal dust have been found in colliers and miners; of steel filings in the grinder; and particles of stone in the mason, as nuclei and centres of irritation.

Diagnosis.—Apostematous phthisis is attended, from its onset, with more pain and dyspnœa than chronic bronchitis or tubercular phthisis, and for some time at first with less expectoration than the former. The expectoration before an abscess opens is thick and ropy, adhering to the vessel. When a large amount of matter is suddenly discharged, it must have collected in an abscess. The patient, if not tubercular, is not apt to emaciate much before this happens, nay, I have seen two instances in which corpulence remained almost undiminished; after it he loses flesh rapidly. The physical signs which attend on it are first, the lessening the capacity of the thorax, dull sound on percussion over the lower part of the lung, and loss of murmur; and, after the abscess is emptied, pectoriloquy, and cavernous or amphoric respiration and cough.

The *prognosis* is rather unfavorable, holding a middle place between chronic bronchitis on the one hand, and tubercular phthisis on the other. When a case occurs in a person of well-formed chest, previously healthy, and without hereditary tuberculosis—and from a transient and notable cause, there is reasonable hope of recovery. The worst symptoms are great emaciation and debility, diarrhœa, and colliquative sweats. The duration varies from a few weeks to many months; in the former contingency, it is spoken of by the vulgar as a "galloping consumption."

Treatment.—As long as there is any urgent degree of local pain, and until the failure of pulse and strength absolutely prohibit, venesection to moderate amount may be repeated at intervals. Cupping the affected side, at first with, and then without the scarifier, will be of service. Large poultices are useful. Blisters, applied in long succession, are among our best remedies. When in any way unsuited, counter-irritation by ungt. tart. antimon. and friction with croton oil may be substituted. Emetics, repeated, have been much employed. Some suppose their action specially adapted to procure resolution of chronic inflammation and absorption of any deposit; others regard them as effectual revulsives. Ipecacuanha is employed alone, or in combination, and very usefully, with the sulphates of zinc and of copper.

Antimonials in small unirritating doses, and in dilute solution, will often prove decidedly beneficial; one or two grains may be dissolved in a quart of water and drank in the course of twenty-four hours. A slight addition of opiate may be made to procure tolerance of it. A mercurial course is affirmed to be advantageously resorted to here; a grain of calomel being given nightly with 10 or 12 of Dover's powder until the mouth is slightly touched.

The iodide of potassium is well suited to protracted cases in which the lung remains solidified and apparently without change, as I have seen for weeks together. Three grains every three hours may be taken for some time; if it disorder the stomach or bowels, we must desist from it or lessen the quantity. It has appeared to me to promote resolution and absorption.

After abscess has formed and been emptied, or while the process is going on, the patient's strength must be sustained by tonics and nourishing diet. Of the former, I prefer the cinchona in infusion with a portion of the tincture added. Great stress used to be laid upon digitalis under these circumstances. It was supposed to be indicated by the inordinate frequency of the pulse and other signs of irritation. I have been disappointed with it and have abandoned it. Far more benefit is to be obtained from prussic acid as an anti-irritant and sedative; and curiously enough, it seems to combine also some tonic power. We may prescribe it with any of our remedies in the dose of half a drop to a drop of the officinal preparation; but I am in the habit of exhibiting the natural formulæ in which we find it—the infusion of the wild cherry tree bark, or of the peach leaf or kernel. These mingle well with cinchona and tend to relieve the teazing cough and restlessness which annoy the sick man. Opiates are indispensable, as palliative of suffering, if not curative.

When diarrhœa comes on, it must be restrained with astringents. For the night-sweats, the sulph. acid. aromatic. is perhaps our best resource.

With a view to promote, as the phrase is, the healing of the ulcerous cavity, the balsamics have been much resorted to. Those which have gained the highest repute are tolu, benzoin, and copaiba—with tar and turpentine. Tar-water, and lightwood rum, and pills of pine gum are much used.

Inhalations, both of gases and solid remedies finely pulverized, such as cinchona and the acetate of lead, have been, and are now experimented with. The results are variously stated, and the effects doubtful.

Our best hope of recovery, and of protraction—which is, indeed, always within our reach in greater or less degree, where recovery cannot be expected—lies in keeping the constitution at its highest attainable point of tone and vigor. While the patient can bear it, exercise in the open air must be advised, and persisted in. He should take a journey or a sea voyage. He should wear flannel next the skin; and his diet should be generous and nourishing.

PHTHISIS.—*Tubercular Phthisis.*

Phthisis, *consumption*, *decline*, are terms from time immemorial applied to denote a condition of disease, in which a steadily progressive atrophy, shown by marked emaciation of the body, formed the prominent symptoms; the picture being rendered more complete if a cough, hectic fever, and great debility concurred. Such, indeed, are the well-known and striking features of the malady now about to engage our attention—tubercular phthisis, from which all the other forms of consumption have derived their names and most of their terrors.

It may be regarded not only as the most insidious and dangerous among the pulmonary affections, but, perhaps, as excelling in its destructive tendencies, all the other disorders, hydrophobia only excepted, to which the human constitution is liable. As its title imports, its characteristic peculiarities are ascribed to the presence and irritation of bodies called *tubercles*, or tuberculous matter deposited in the air tubes or substance of the lungs. The formation of these bodies, the deposition of this peculiar matter, depend, probably, upon an original defect in the organism, which, if not identical with, is closely allied to the strumous diathesis. It is in subjects who have exhibited the most obvious marks of scrofulous disease, that tubercles are most frequently found; whether in the mesentery, lungs, or elsewhere; and the tendency to their development in the pulmonary tissue is so strong that Louis affirms positively, as the result of a long series of observations, "that whenever we find tubercle in any of the other organs or tissues, we may surely infer its existence in the lungs." Phthisis is familiarly noted as a hereditary malady in scrofulous families, as attacking the children of scrofulous parents, and supervening in the advancing lives of those who, when children, had suffered from scrofulous enlargement of the glands of the neck, white swelling, etc.; to which we should add the common remark, that the physical and physiognomical characteristics of the strumous diathesis have been universally regarded as prophetic, also, of future phthisis; the fine, clear skin, the delicate, blooming complexion; the full, large vein, and the projecting, ruddy lip.

Tubercular phthisis differs, then, from the other pulmonary diseases classed with it, under a common name, and spoken of as *Consumptions*, inasmuch as they are originally local affections, lesions, simply, of the lungs and their appendages, involving by their consecutive irritation, general disturbance and disorder of the body; whereas, in the present case, the primary derangement is general or constitutional, the lung being only one among the organs and tissues involved in the progress of its successive developments. I must not be understood to say that phthisis consists in the mere presence of pulmonary tubercle. The predisposition thus pointed out requires to be excited and urged into action, before we have the symptoms of phthisis to contend with. A tubercle, we know, may exist in the lung without creating any disturbance or uneasiness. In this state, it is said to be indolent. It is only when the parts about it are irritated and inflamed, and become the seat of congestion, that its malignant qualities are notable.

The *softening* of the tubercle itself, a phenomenon formerly discussed, takes place coincidently with this surrounding inflammation, of which it has been considered the cause by some, by others the effect.

Another source of tuberculous predisposition has been suggested, and some of the writers on phthisis have ventured to enumerate contagion among the causes of the disease. This opinion is prevalent on the continent of Europe, not only among the common people, but with the best informed medical men; and the wards of the hospitals, in many parts of Italy, at least, are arranged conformably. We may add the testimony of Morton, Darwin, and Good, in Great Britain, the latter of whom declares unequivocally, that he has met with numerous cases that could not be ascribed to any other cause. I would use the more cautious language of Cullen, and say that "I dare not assert that it never is contagious." We know that it very frequently attacks the several members of the same family—the husband and wife, as well as the brother and sister, and that many nurses die of it, after a protracted period of assiduous attention and close confinement in the chamber of the consumptive. These facts are attempted to be explained, it is true, by references to other agencies, as exposure to the same local causes, air, diet, grief, etc., but not satisfactorily.

When treating of scrofula, it was observed that its several developments or determinations are influenced by age. The pulmonary derangement of tubercular phthisis is apt to show itself a few years after puberty, in early maturity, from the eighteenth to the twenty-fifth year of life. Exceptions to this rule may occur, but it is very generally observed. It is rare that tubercular phthisis first shows itself after the thirtieth year. Home and Alison agree in the remark that "in the upper ranks of society there are more females than males attacked, owing to the more impressive variations of dress, but in the lower classes the male patients are more numerous, in consequence of their more frequent and severe exposures."

Every writer on this form of consumption has commented on the peculiarly insidious manner of its invasion. The feelings of uneasiness and ill health which the patient may suffer in the early stages, are indeed often so ill defined that they can scarcely be made topics of conversation or complaint. Perhaps his friends may, in the first instance, notice some falling off in condition, some hollowness of eye or cheek, that gives warning of obscure and latent disease. You may trace the coming of the destroyer, to use the beautiful language of Mrs. Ward, "in the clear, transparent skin, in the bright eye and ever-brilliant cheek, in the delicate lip, the drooping, slender form, the damp and shining hair, and the heavy breathing after slight exertions." Or there may be a short, hacking cough, recurring frequently, as if habitual, but without pain. In walking, or ascending a stair, he pants, and is easily fatigued. On making a deep inspiration, some constriction or uneasiness may be felt. These symptoms often abate, especially if the season and temperature are favorable, and they are forgotten. They return, however, on some exposure, and the cough increases in force and frequency, harassing the patient at night, or early in the morning, when there is scanty mucous expectoration, perhaps tinged with a little blood occasionally. Authors say that hæmoptoe is seldom considerable in tubercular phthisis, but I have seen several striking examples to the contrary. The dyspnœa and thoracic uneasiness grow more permanent; fixed, and sometimes acute pains are felt in different parts of the chest, with a sense of weight and tension. The expectoration becomes gradually more copious—muco-purulent sometimes, sanious and offensive; there is great weakness, with emaciation. Hectic, which supervenes earlier in some cases, and later in others, without any direct relation, as I have thought, with the extent of local change, is now developed with diurnal or double diurnal paroxysm, ushered in or commencing frequently in the morning with chill, and usually followed at night by the so much dreaded and debilitating night-sweat.

In early phthisis, the expectoration is frothy and colorless. Sandras says, if examined with the microscope, there will be seen numerous globules of the same size, grayish white, rounded, nearly opaque at the centre, gradually becoming more transparent at the circumference. These, I suppose, are the "tubercular corpuscles" described by Bernard and Robin, as "bodies slightly irregular on the surface, polyhedric, containing in the centre many granulations in an amorphous mass, contour well marked, quite dark. Water has no action on them; acetic acid pales, but does not dissolve them. The corpuscle has no nucleus; in the concrete pus globule, acetic acid at once shows the nucleus." The expectoration changes as the case progresses; showing, of course, all the influence of the inflammation excited by a softening tubercle; streaked, sometimes, with blood, sometimes mingled with pus and sanies; tuberculous matter itself is sometimes distinguishable, and when the cavity is emptied, it excretes very often a large amount of purulent matter of offensive odor, and nauseating flavor. Hæmoptysis is of frequent occurrence, at all stages and in various amount.

In the female sex, as the disease advances, and sometimes early in its progress, the menstrual discharge ceases to flow; "and this circumstance," as Cullen rightly observes, "is to be considered as commonly the effect, although the sex themselves are ready to look on it as the sole cause of the disease." This error is especially prevalent among our laboring population, and we are incessantly teased by our consumptive female patients of this class, for emmenagogues to remove the evil. They are, indeed, very much in the habit of prescribing for themselves, by stealth, articles of that kind.

The pulse is usually, from the first, quick, tense, and jerking, and attains, as the case goes on, a remarkable frequency—counting from one hundred to one hundred and sixty in a minute. The sclerotica of the eye becomes of a pearly white, owing, it is supposed, to the disappearance of the red vessels, and the absorption of animal oil from the cellular tissue; the same explanation being offered of the lustrous whiteness of the teeth; the whole body is shrivelled and extenuated, the nails even becoming adunque, or bent inwards, for want of the usual fleshy cushions at the ends of the fingers. Until this period, nay, sometimes to the very last, the appetite of the patient remains good, and his digestive organs preserve their tone; he is cheerful, lively, and full of hope, and flatters himself with a confident expectation of recovery. This remark, which has been extended to all the forms of consumption, is strictly true, only as regards tubercular phthisis, and by no means applies to all the victims of the disease. Rush tells us, he "never met with but one man who would acknowledge that he was in a consumption." I have witnessed the long illness and the deaths of many subjects of phthisis, who were neither deceived themselves, nor at all disposed to deceive others, as to the actual hopelessness of their condition. On the other hand, in many such patients, I have had to contend with extreme dejection of spirits. Dyspeptic phthisis, and, indeed, all cases associated with functional or organic derangement of the chylopoietic viscera, seem to me apt to be accompanied by deep gloom and depression—a state of mind almost invariably produced by gastric and hepatic disorder. And in the latter stages, even of tubercular consumption, when the irritating and disturbing influences of the disease are extended to the stomach and bowels, the spirits of the unhappy patient will often be found to sink into extreme anxiety and even despair.

To complete the melancholy description of this last and cureless condition; the patient is harassed with frequent, loose, and often painful stools; the colliquative sweats and diarrhœa show, at first, a tendency to alternate with each other, but soon go on together, making rapid inroads on his little remaining strength; his voice is hoarse and weak; his mouth and tongue, lips, cheeks, throat, inflame and ulcerate with aphthous sores, which render deglutition difficult; œdematous swellings distend the limbs; he is too feeble to expectorate the matter effused in the lungs and bronchi, and dies at last, suddenly suffocated; or, as Young affirms, "the expectoration in some instances ceases, as if the capillaries had lost their secretory power, or as if the fluids of the system were exhausted;" and he languishes for a greater or less period, in an almost lethargic condition, sinking gradually into the long sleep of death.

The *physical signs* of the successive stages of phthisis, have been carefully studied. In the incipient condition they are negative rather than positive. Tubercles are situated chiefly at the apex of the lung at first; there may be dulness just under the clavicle on percussion.

The earliest signs which can be traced by auscultation in tubercular phthisis are, says Thompson, "1. The modification of the inspiratory murmur denominated 'jerking,' in which the inspiration seems to be effected by a succession of waves; and 2. A modification of the expiratory murmur, consisting in an apparent prolongation, and an increase of coarseness. The wavy inspiration probably indicates the presence in the lungs of some deposit of impaired vitality." Walshe lays the same stress upon the prolongation of the expiratory murmur. The normal expiratory sound is about one-fourth, he says, of the duration of the inspiratory. I do not find the difference so great in health; but its approach to equality with inspiration, is certainly suspicious, if not characteristic.

When softening occurs, the surrounding inflammation consolidates the tissue, and we have loss of vesicular murmur and marked dulness; these spread with the spreading infiltration and deposition. The characteristic sign of this stage is the moist crepitation or muco-crepitant rhonchus; there is flattening of the chest; the respiration is tubular, the voice hoarse with expectoration of puriform mucus. When a vomica is formed, and a cavity more or less emptied, we have resonance and pectoriloquy; to which are added the metallic tinkling, and when the cavity grows large, amphoric resonance. Ulceration may perforate the pleura, when we shall have pneumothorax.

Autopsy reveals all the various forms of tuberculous deposition formerly spoken of—miliary tubercle, gray infiltration, and larger amorphous or seemingly encysted masses. All the effects of inflammation are then shown; clots of blood filling cavities, abscesses of various sizes, ulcerative destruction and softening. But the morbid changes are not confined to the respiratory apparatus. The bowels are also ulcerated, and the mucous membrane of the stomach injected in patches, and, like the mouth and tongue, red and aphthous looking. It is noted as "a curious fact, that while the body generally is emaciating to the last degree, two organs, the liver and the heart, should be subject not rarely to a contrary influence; the intimate structure of the liver undergoing a fatty degeneration, while the surface of the heart is loaded with fat."

The *diagnosis* of tubercular phthisis is to be drawn from a collation of all the points in its history as above given. It is only doubtful at the very beginning; the cruel malady soon unmasks its true character. I have spoken of both the rational and physical tokens which usher it in. Much stress is to be laid on its connection with hæmoptysis. I have known more than one case in which this was the very first symptom. If there were any known hereditary tendency, I should hardly hesitate to consider this occurrence as diagnostic. Paleness and emaciation are usually peculiar, at least in degree; and the debility and dyspnœa, especially after muscular effort, disproportioned to the other appearances of ill health. There is an absence of pain, and sometimes a cheerfulness and hopefulness which have been dwelt on unduly.

The *prognosis* is proverbially unfavorable. Yet late observers, Swett and J. Hughes Bennett, chief among them, perhaps, have recorded many observations which lead them to the belief that tubercular phthisis is greatly more curable than has been supposed, and, indeed, that it not unfrequently undergoes spontaneous cure; by the absorption of all but the earthy particles of a tubercle, and by the healing of an emptied vomica. This last they infer from the puckered appearance of portions of lung.

"The arrestment of tubercular ulceration," says Professor Bennett, "may take place in three ways: 1st. By the gradual transformation of the exudation into cretaceous and calcareous concretions. 2d. By expectoration and absorption of the exudation, the collapse of the ulcerated walls and formation of a cicatrix. 3d. By the ulcerated walls becoming covered with a smooth membrane, remaining open, and constituting cavities which have occasionally been mistaken for dilated bronchi. The occurrence of black carbonaceous deposit is very apt to take place in the neighborhood of the cretaceous concretions and cicatrices, thus communicating increased density to the texture."

While Swett admits that "phthisis is a most fatal disease, and that the prognosis is always unfavorable," he avows his belief that the number of ascertained recoveries will be found to increase as the diagnosis of tubercle becomes more certain and satisfactory. It is pleasant to record these views, sanctioned as they are by the favorable opinions of Boudet, Roget, and Professors Wood and Green. In my own long experience, there have occurred five or six instances in which I cannot doubt recovery from tubercular phthisis, carefully diagnosed; but it is not, after all, an event ever to be regarded as within the limits of a *reasonable* expectation.

The *duration* of phthisis varies indefinitely. An accidental supervention of pleurisy or pneumonia may cause the fatal termination in a few weeks; by care and prudence, by proper treatment and management, including well-adapted changes of climate, it may be protracted many years. I have seen one very interesting case steadily, though slowly progressive—certainly with no interval of even seeming retrocession or improvement—last fully fifteen years. Something less than two years, a period that shall include two winters, may be mentioned as the average duration. The majority die in early spring, I think. The tenacity of life differs so greatly in different persons—some sink so readily, while others resist disease so tenaciously, that it will not be safe to be guided in our anticipations by the degree of local lesion discoverable; the condition and seeming elasticity of the general system give the clearest tokens of the coming event. "Beyond a certain degree of emaciation and debility," says Cullen, most truly, "no man recovers."

We should be aware, that phthisis may, in rare instances, go on to a fatal termination, without thoracic pain, or notable dyspnœa, or cough. I once saw a patient die, attacked while barely convalescent from typhous fever, whose case, from the absence of those symptoms, was not understood; the right lobe of whose lung was a mass of tubercular deposit. I attended, in the last weeks of his life, a literary gentleman, whose physicians had treated him for chronic hepatitis and diarrhœa. He had labored under no dyspnœa, and almost no cough. In complying with his request, that his body should be examined, post mortem, we found his liver little, if at all, affected, and his lungs full of tuberculous matter, and much disorganized.

The relations of phthisis with other diseases demand notice. Fistula n ano has been observed very often in consumptive subjects, and even after phthisis has commenced, and in this case is said to protract or even suspend its progress. A similar connection or alternation has been said to exist between it and mania; but this is very doubtful. Intermittent fever has also been alleged to exert a suspensive or protractive power over phthisis. I doubt the fact; nay, I have repeatedly seen our malarious fevers develop or excite consumption in the predisposed.

It is generally believed that pregnancy arrests, even in its advanced stages, the progress of phthisis, and that the feeblest patient will almost certainly survive until the child is born. Lactation is not, however, supposed to prolong the time; and such a patient will sooner succumb if permitted to nurse her infant.

Pathology.—Tubercular phthisis, when developed, may be said to consist in three distinct elements. 1. A vice of nutrition, whence the morbid deposit—tuberculosis. 2. The local pulmonic inflammation occasioned by its presence, or by its softening, or by whatever coincident change attends that condition; and, 3. The constitutional and sympathetic results, the hectic and other derangements which supervene.

The *treatment* must be carried out in accordance with these views. For tuberculosis, as a diathesis, a remedy or corrective has been sought in vain. Almost equally futile have been our efforts to discover any means of arresting the further accumulation of morbid matter in the lung, or of promoting the absorption of that which has already been deposited. To improve the function of assimilation, and to procure the substitution of healthy for diseased nutrition or deposition of plasma, the present favorite remedy is the cod-liver oil, which is alleged to work wonders in this emergency, and which is eulogized by no less authorities than Thompson, Walshe, and Wood, not to mention a host of additional names.

Cod-liver oil is asserted by Dr. T. Thompson to increase the deficient proportion of blood globules, and diminish the fibrin when hyper— in amount. He refers to its utility in rheumatism and in diabetes, where, as in phthisis, "the morbid proportion of albumen and corpuscles shows the impoverished condition of the blood." Walshe says of it, "that it benefits more rapidly and effectually than anything else; that it must save waste, and render food more assimilable, and that increase of weight is the best test of its usefulness; that its good effects are, *cæteris paribus*, directly as the youth of the patients." He adds, "that its curative power is as yet undetermined, and that pulmonary inflammation and hæmoptoe contraindicate its use." Prof. Wood expresses much expectation of benefit from it; and, after stating that a notable reduction in the mortality of phthisis in and near Philadelphia was ascertained, is disposed to ascribe it to the employment of this (then) new remedy. But if I read the tables rightly, the result does not justify the anticipation. The deaths were reduced from 1848, when they were 965, to 939 in 1849, 907 in 1850, and 801 in 1851; but they rose again in 1852 to 1204. In 1853 there were 1246; in 1854, 1394; in 1855, 1327; in 1856, 1501; in 1857, 1544; and in 1858, 1659. I shall be heartily pleased if they become and continue more favorable; but I confess that I am by no means sanguine, nay, scarcely hopeful that it will be so. I am not sure that, among the numerous patients I have seen taking it, there has been a single instance of decided benefit; certainly there has not been one cure. Even Walshe's test of weight does not seem to prove its efficacy or adaptation. Consumptives sometimes become less haggard or plumper under its use, but die nevertheless; and Bowditch tells us of one who "got disagreeably fat while the physical signs were gradually augmenting. It seemed as if the oil would exude from his face." This is not the only oil found serviceable in phthisis, if the statements are to be depended on. Le Vaillant, in his *Travels in Africa*, informs us that "the people of the Cape are persuaded that the fat of the hippopotamus, taken in a potion, is sufficient to cure radically those who are afflicted with disorders of the breast"—p. 351. This fat, which he preserved in bottles made of skin, had the usual consistence of olive oil. The ancients advised inunction with oils in phthisis. Whaling voyages have long been believed to be specially serviceable in curing consumption. Olive oil and neat's foot oil have been prescribed domestically and by empirics in various places. The cocoa-nut oil, which by chemical analysis seems to approach most nearly the composition of cod-liver oil, is also said to be its best substitute, while it is infinitely less disagreeable.

Crawcour, of New Orleans, recommends glycerine, and a solution of phosphorus in glycerine, which he calls "the glycerole of phosphorus," as efficient and comparatively agreeable substitutes for cod-liver oil.

The pyroacetic spirit naphtha, wood naphtha, is also rich in the elements which abound in oil, and are supposed to be useful as substituted for or antidotal of tubercle, or corrective of tuberculosis. It was introduced by Dr. Hastings, who prescribed it in doses of fifteen drops thrice a day to an adult, increasing, if the stomach will bear it, to forty or fifty drops thrice or four times daily, in a little water. I have not seen any better effect from naphtha than from cod-liver oil.

The zealous and philanthropic Marshall Hall, has suggested an external application, of which I know not whether it is to act endermically or by inhalation. As the same elements, carbon and hydrogen, are offered to the lungs and skin, which we present to the stomach in the two former remedies, I would suppose that similar results were intended. Some half dozen folds of linen laid over the chest, just below the clavicles, and fastened to the dress at the shoulders, are kept continually or frequently wet with a lotion composed of one part alcohol and three parts water. Dr. Hall declares that this measure possesses a greater power in checking the progress of deposition and softening of tubercle in the lung, than any other he ever tried.

As tubercles become indolent by the opposite process to softening, growing indurated and unirritating by the predominance of the earthy element in their composition, the phosphate of lime, introduced by Beneke into practice, and eulogized by Prof. Stone, of New Orleans, is alleged to be well adapted to the arrest of phthisis. The remedy is worthy a trial.

Under the head of tuberculosis, I spoke of the treatment by the hypophosphites, proposed recently by Dr. Churchill. In his essay laid before the French Med. Acad. he says, that "the number of cases of phthisis thus treated amounts to thirty-five. All were in the second or third stages of the complaint; *i. e.* they had either softened tubercles or cavities in the lungs. Of these nine recovered completely, eleven improved considerably, fourteen died, and one remains under treatment." The action of these salts he affirms to be twofold. "On the one hand, they increase the principle, whatever it may be, which constitutes nervous force; and, on the other, they are the most powerful of hæmatogens." He has given of the hypophosphites of soda and lime from ten grains to ʒj in the twenty-four hours. The highest dose yet taken by an adult is twenty grains.

I am as little sanguine of the effect of these new remedies as of the old; but I ought to say that among many failures of experiments made with them, I have heard of one striking success. Dr. Da Costa reports to me a case of prompt and undoubted cure of phthisis fully developed, under their administration.

Iodine having been found useful in so many forms of scrofulous disorder, is still the subject of hopeful experiment in the endeavor to procure the absorption of the pseudo-plasma in the lung. It is employed in many modes. I prefer either the simple dilute solution of Lugol, in which one grain is diffused in a quart of water, to be taken in the course of the day, or the still better formula of the deutiodide or biniodide of mercury and potassium, brought to the notice of the profession in our country by Dr. Channing. It will be perceived that I am very far from being sanguine as to the effect of any remedy in phthisis; but I cannot help thinking that in the incipient stages there is as much or more to be expected from this combination than from any other medicine. I have often been persuaded that the rate of progress of the disease was distinctly retarded under its use. ℞.—Hydrargyro-iodide of potassium, gr. j; alcohol, ℥j. M. S.—Ten drops, ter die.—Griffith: from Channing.

The second element which goes to constitute phthisis, the local pulmonic inflammation namely, is rather more amenable to our treatment, which may be spoken of as properly *palliative.* I need not repeat what has been said on the subject heretofore, under other heads, but merely refer to the cautious employment of the lancet; of cupping over the chest; of antimonials; of emetics generally, and of digitalis. Antimonials have been highly eulogized by Laennec and Louis. I abjure their large doses, but have derived benefit from the method of Balfour and Lenthois, who gave it in very diffuse solution. I mix it in water, in the proportion of *one* grain to a quart, of which the patient takes as much in the day as he can bear without vomiting or nausea, which I enjoin upon him to avoid. Of the emetic practice in various modes, extravagant eulogies have been written. "If I ever saw," says Jenner, "a case or cases in which tubercles have been apparently formed, and afterwards absorbed, it has been when the individual, either by accident or design, was kept for awhile under the constant influence of sickness, either from being tossed about on the ocean, or from the use of medicines which nauseated." Active emetics, occasionally repeated, have certainly done good. They disgorge from time to time the air cells and bronchi of the morbid secretions which oppress and irritate them, and by revulsive determination relieve the whole lung. There is reason, I think, for preference of the "dry vomit" of Marryatt, consisting of the combination of ipecacuanha with sulphate of copper; refusing all drinks or dilution. Its effect as expectorant is remarkable when used in this way.

Prussic acid is, in my hands, so valuable a palliative, that I regret to find it falling into disuse. Magendie, Granville, and Brera speak strongly in its favor. Dr. Oliver, of Salem, claims the merit of having introduced it; he prescribed both the distilled water and the saturated tincture of lauro cerasus as early as the year 1810. It may be exhibited with safety and advantage in any of the officinal preparations, if a due degree of caution be observed; I prefer, however, as free from risk, the strong infusion of the wild cherry-tree bark, and the water of bitter almonds. The former is doubtless a tonic also, of no ordinary power.

In this relation, we may next speak of digitalis, so long the object of such exaggerated commendation. Ferriar affirms of it, what is far more strikingly true of the veratrum viride, that "in it we have the means of regulating the pulse to our wish." Darwin, Fowler, and Drake, ascribe its beneficial agency to an asserted power "of diminishing secretion and augmenting pulmonary absorption." Others regard it in the light of a specific, whose influence is peculiar, inexplicable, and antidotal. M'Lean tells us that it will sometimes succeed when all other remedies fail. Kinglake declares that he cured seven cases out of fourteen with it. Drake gives an account of fifteen cases treated with it, of which nine recovered. Magennis lays claim to still more astonishing success. Out of seventy-five patients at the Naval Hospital of Plymouth, he reports forty-four cured, twenty-two relieved, and but ten deaths. Beddoes gives utterance to his exulting confidence in it, by the following enthusiastic expressions: "I daily see many patients in pulmonary consumption, advancing towards recovery with so firm a pace, that I hope phthisis will henceforward be cured as regularly by foxglove as ague by the Peruvian bark." Some use similar language now, of the cod-liver oil, and, I fear, as justly. I have derived benefit occasionally from digitalis, in cases where the pulse is inordinately frequent, and the patient, neither getting worse nor better, suffers from protracted pain in the chest and a teasing dry cough. The pulse, under its use, becomes slower, and the cough less urgent. I employ the saturated tincture and the powder; avoiding nausea and vertigo, and abstaining from its use as soon as the action of the heart becomes intermittent; indeed, I am unwilling to prescribe it for more than ten days consecutively; returning to it at intervals, if the symptoms above enumerated continue.

Opium is incomparably our most valuable palliative. It was highly prized by both Sydenham and Rush. It controls irritation, soothes irritability, and allays more than anything else the general or constitutional disturbances sympathetically excited. I regard it, for my own part, as so essential to the proper treatment of the case, that I have never seen an instance of relief without it. It lessens the frequency and violence of the cough; bestows upon the exhausted sufferer quiet slumber and pleasant dreams; checks the colliquative sweets and diarrhœa; and when all hope has deserted us, "assuages the pangs of parting life, and smooths the pillow of dissolution." When the diarrhœa is obstinate, the acetate of lead, in proper doses, should be combined with opium. Kino, and other astringents, may also be used, as recommended under that head.

As substitutes for opium, when, from any circumstances, its administration is inconvenient, hyoscyamus and lactucarium have been proposed. I have no confidence in either of them, and have never failed, by proper experiment of appropriate doses, to find among the numerous formulæ in which opium is mingled, some one entirely unobjectionable. Of these, the denarcotized laudanum, the acetate and muriate of morphine, M'Munn's elixir of opium, and though last, not least, the tinct. opii camph., the elixir paregoric, deserve special mention, and are of inestimable value.

Local sedatives also have been applied directly to the diseased lungs. When the stores of pneumatic chemistry were first laid open to physicians, the discovery excited unbounded hopes of finding here medicinal agents of importance, and especially in affections of the respiratory organs, to which they seemed immediately applicable.

Dr. Beddoes, with laudable zeal, instituted a course of experiments, which were, at first, alleged to have been strikingly successful. The gases have, however, fallen into almost entire disuse, though Murray has lately endeavored to renew our lost confidence in the nitrous gas, which he eulogizes highly as a specific and very promising remedy.

Of chlorine and iodine inhalations, I have nothing to add to what was formerly said. My trials with them have produced no good results whatever. Piorry strongly eulogizes the latter.

We would anticipate some sedative influence from the inspiration of air made to contain a less quantity of oxygen, which is generally regarded as a stimulant, such as atmospheric mixtures with nitrogen and hydrogen, and with carbonous oxide or carbonic acid. In a similar way, we may account for the advantage said to have been derived by some consumptives, from residing in stables with cattle, so, much in vogue in England in the time of Darwin and Beddoes. Dr. Priestley's daughter, and another English lady of distinction, are said to have been thus cured. Patients are occasionally relieved if not really benefited by breathing the fumes of burning or boiling tar or resin.

Very recently the treatment of diseased lungs by inhalation has been made a more definite specialty, and I cannot help anticipating new and beneficial results from the experiments now going on. I have, I think, seen the finely levigated powders of cinchona and the acetate of lead useful in this way in restraining profuse expectoration. Hunter, of New York (*Med. Gaz.*, March, 1855), makes five classes of inhalations—expectorant—anodyne—astringent—antispasmodic and alterative. I can readily believe in the efficacy of each of these. I have witnessed a soothing influence from the breathing of chloroform in irritative cough, and in hooping-cough; why not of opium smoked, as stramonium and tobacco are in asthma? and so of the rest.

But this is not the only local treatment now applied in the management of phthisis. Professor Horace Green, of the New York Medical College, to whose skill and courage we owe, as I have said, the valuable resource of the application of the solution of nitrate of silver to the affected surfaces in chronic laryngitis, and in croup, has had the extraordinary boldness to introduce an elastic tube into the divisions of the bronchi, and through it to inject medicated fluids into the ulcerated air vessels, and the tuberculous cavities. Whatever may be the ultimate result of this recent and as yet experimental method of cure, I cannot make a record of it here without expressing my high sense of the zeal and self-reliance displayed in the conception and execution of the plan. "Having under treatment daily," says Professor Green, "patients laboring under chronic bronchial disease, and those affected with tuberculosis in almost every stage of the disorder, I determined to test the effect of a solution of nitrate of silver, applied directly and freely to the bronchi, in diseases of their membrane; also, in disease of the lungs, to inject, if possible, the same solution into tubercular excavations." The first operation of *catheterism of the air-passages* "was performed on the 13th October, 1854. I passed No. 12 of Hutching's elastic tubes, which is thirteen inches long, through the trachea, and into the left bronchial division. Through this tube, with a small glass syringe, I injected one drachm of solution of nit. argent., of the strength of forty grains to aq. ℥j, into the lung. No cough whatever, or any sense of suffocation, followed. A few minutes after, the patient felt a 'warm sensation' in the upper portion of the left lung, but no pain whatever. She returned, to have the operation repeated, four days after, stating, that for twenty-four hours after the use of the injecting tube, her cough and expectoration were both greatly diminished, and that she had breathed with more freedom. The tube was again introduced into the trachea its entire length; and at this time one and a half fluidrachms of the solution were thrown into the lungs. The immediate results were the same as at first; but after some minutes, she began to cough, and expectorated easily and at once nearly two ounces of purulent matter, changed in color and consistence apparently by its immediate contact with the argentine solution. The relief which followed this last operation was still more marked and decided than at first. The cough was much relieved, the expectoration yet more diminished, and the breathing easier." Dr. Green performed the operation upon this patient seven times more with continued good effect. "Her improvement was constant. She grew stronger, and gained flesh; but being obliged to return to her home, she left with the intention of coming back to renew the treatment in a few weeks. Since the 13th day of October there have been treated, for a longer or shorter period, thirty-two patients laboring under tubercular or bronchial diseases, by the direct introduction of the strong solution of nit. arg. into the lungs, through the elastic tube. Of these thirty-two, nineteen showed unequivocal signs and symptoms of tuberculosis; thirteen were cases of chronic bronchitis, some of them of many years' standing; nine of the first presented, on auscultation, the usual signs of the presence of tubercular cavities in one or both lungs. All these cases of thoracic disease, with one or two exceptions, appear to be benefited, some of them greatly, by this method of topical treatment."

I have preferred to give this impressive history in Professor Green's own words, and shall offer no comment. All honor to the effort and its originator! time alone can establish its actual value; but no time, nor any disappointment, can detract from the merit of the ingenious conception, the courageous attempt, and the skilful accomplishment.

Since the above paragraphs were written, this practice of Dr. Green has been imitated by many physicians on both sides of the Atlantic, and the most unassailable testimony is offered, not only of the safety but the beneficial influence of his method of treatment. I quote, for example, from the recently published volume of Prof. J. H. Bennett, of the University of Edinburgh—*Clinical Lectures on Medicine*, p. 609—the following sentences: "Without entering into minute particulars, I have only to say that I have confirmed the statements made by Dr. Horace Green. I have now introduced the catheter publicly in the clinical wards of the Royal Infirmary, in several patients affected with phthisis in various stages, in laryngitis, and in chronic bronchitis with severe paroxysms of asthma. I have been surprised at the circumstance of the injections not being followed by the slightest irritation whatever, but rather by a pleasant feeling of warmth in the chest (some have experienced a sensation of coolness), followed by ease to the cough, and a check, for a time, to all expectoration. Further experience of this new practice is required before its permanent good effects can be judged of, but my belief is, that in appropriate cases, it will prove of great advantage."

Lastly, in a malady in which we so often fail utterly to correct the original vice of nutrition, and to arrest the local inflammation and disorganization attendant, it becomes our duty to resist, relieve, and remedy as far as possible the general or constitutional consequences which follow in long and melancholy train. Of the hectic fever I have already acknowledged that we have little or no control. Digitalis, prussic acid, cinchona and quinine, opium, the spider's web—all sedatives, anti-irritants, and antiperiodics have been tried, and tried in vain. The night-sweats, probably the solution of the night paroxysm of hectic, are treated with sulphuric acid, the elixir vitriolicum, with gallic acid, and perhaps best with the oxide of zinc, in the dose of three or four grains at bedtime, with opium or cicuta. The diarrhœa, so generally supervening in the progress of phthisis, must be restrained with astringents: kino or tannin, and opium. If these fail, we resort to the acet. of lead, the sulphate of copper, the nitrate of silver. The trisnitrate of bismuth with Dover's powder is much eulogized. For the annoying cough we have numerous demulcents and other palliatives; chloroform, mixed with three or four times as much spirits of wine, is breathed; ether and brandy in which cicuta is infused; mucilages, with the balsams, tolu, myrrh and benzoin, tar and creasote, are recommended. Opium is indispensable here, and gives more comfort than all our other resources put together.

Meanwhile the strength of the patient must be sustained. The disease is a chronic and protracted one. Low diet may be necessary at first, for a time, but must soon be substituted by a free and generous indulgence in nourishing aliment. Even wine, porter, and other fermented drinks, may be found well adapted and valuable. A careful experiment may be made in any case without risk.

Of tonics, properly so called, I know but two in which any confidence is to be placed. Most of my patients take, of choice, the infusion of wild cherry-tree bark, and believe that it aids the appetite, and improves the digestion.

Cinchona, also, in strong infusion, is often highly available. Morton made much use of it. Hasting, Broussais, and Duncan recommend it highly. Salvadori and May, regarding phthisis as dependent upon debility, prescribe copious meals of soup, meat, eggs, oysters, porter, and wine, alternately with the use of emetics, bark, and laudanum.

The "sugar-house cure of consumption" is, perhaps, as much owing to the full and luscious diet, as to the airs breathed, or any of the other contingencies dwelt on by the ever-zealous Cartwright, to whom we owe some interesting essays on the subject.

Exposure to cold or moisture must be sedulously avoided; but the patient must live as much as possible in the open air. In the winter he must seek a balmy and genial climate; Florida, especially in the interior, Cuba, Jamaica, St. Thomas, or Santa Cruz—always in the country, avoiding the cities, are the best points of residence during the mid-winter; as spring comes on, Savannah, Aiken, and Summerville may be chosen. Pine land residences are highly salubrious to the consumptive. Exercise is useful, but must be regulated and proportioned to the strength. If he can sit in the saddle, horseback exercise is best of all. Walking is dangerous, if there be any tendency to hæmoptysis. A long sea-voyage is beneficial in almost all cases.

The lungs may be advantageously exercised by artificial or voluntary respiration; this may be carried on either through or without a tube.

A handkerchief or woollen comforter should guard the mouth and nostrils against the admission of keen, cold air, if at any time such exposure be unavoidable. The clothing should be warm and comfortable, and the chamber well ventilated during the day, and kept through the night at a temperature above all risk of chilliness.

ASTHMA.

This formidable and distressing disease may justly be reckoned among the most obstinate and indomitable that affect the human frame. Whether it be owing to something in its own nature, or to the defect of our knowledge of its pathology and treatment, I will not decide. It must be admitted, however, that, while we are able very generally to relieve in some degree, and palliate the suffering which it occasions, it is rarely allotted to the physician to witness the entire cure of an asthmatic under his care.

The term asthma is applied correctly to designate a species of dyspnœa, which may be described as *paroxysmal*, spontaneously remitting, or subsiding altogether, after a certain duration; and *recurrent*, disposed, that is, to return of its own accord, as well as upon the reapplication of the same exciting causes which originally gave rise to it.

Laennec, in one of his paragraphs, seems partially inclined to deny it a distinct existence as a separate form of disease, and speaks of it as a mere symptom of certain organic lesions, which he points out. A little further on, however, he confesses unequivocally, that it may exist, unattended by, and independent of any such organic lesions, though he affirms this to be a very rare case. Admitting the fact to be as he asserts, the question would still be entirely undecided, whether these lesions are or are not connected essentially, either as causes or effects, with the disease under discussion. He treats of it as complicated chiefly with "chronic catarrh;" and MacIntosh implicitly follows him, confounding it with "chronic bronchitis." I am at a loss to imagine how any one can be misled by views so obviously erroneous. Catarrh and bronchitis exist in thousands of instances, without the supervention of asthma. The dyspnœa which may be present in these is perfectly distinguishable from the peculiar and characteristic dyspnœa of the asthmatic.

Asthma is often described as of two species or varieties, the dry or nervous, or spasmodic, and the humid or humoral. In the first, the difficulty of breathing is convulsive, attended with a hissing or creaking noise; the paroxysm, though severe, is usually short, and terminates with little or no expectoration. In the second, the respiration is labored and vehement, apparently impeded by the effusion of an inordinate quantity of mucus within the lungs; the mucous râle is loudly audible; the paroxysm is of tedious length, and terminates at last with free expectoration of a frothy or tenacious mucus.

The differences thus dwelt on, are sufficiently notable, and indicate corresponding variations in the actual conditions of the parts affected; but there are points enough in common, and of such characteristic nature, as to justify us in considering the two modes of asthma under one head and denomination.

It is frequently asserted, that asthma exhibits itself as a symptom of other diseases of the lungs, and of affections of the heart and large bloodvessels. This I do not believe; I have met with no such instances, nor am I satisfied with the alleged proofs. Dyspnœa is a common symptom of all these; but dyspnœa is not asthma. Asthma may, perhaps, by the vascular obstructions and congestions which arise during its progress, after long continuance, and frequent recurrence, originate any or all of them. Or, it may be transiently connected with some among them, as produced by the same excitement in systems predisposed or habituated to it, as when an asthmatic is attacked after getting wet, with pleurisy, or pneumonia, or bronchitis. This is only admitting the two states of disease to be compatible with each other, but by no means placing them in the relation of cause and effect.

The *paroxysms* of asthma have their access almost uniformly in the night, and are generally preceded or accompanied by evident tokens of gastric disturbance or indigestion, oppression at the scrobiculus cordis, heartburn, flatulence, vomiting, and a loose griping stool. The patient is attacked soon after going to bed, or awaked from his first light sleep, with a sense of uneasiness and constriction of the chest, difficulty of respiration, and cough. He is obliged to sit up, and cannot bear the weight of the bedclothes, nor the confinement of any fastenings about the upper part of his body; he seeks for fresh and cool air, with the most intense eagerness and avidity. There are wheezing and panting; the shoulders are elevated, the nostrils expanded widely, the eyes staring and bloodshot, the lips bluish, and the whole countenance expressive of anxiety and distress. The cough is, in most, loud, sonorous, often repeated, and at first dry; in some bad cases it is husky and feeble, gasping and whispering; after a little while some frothy mucus is brought up, which, in the humid variety, increases in quantity as the paroxysm declines, and often becomes abundant. The violent efforts made in coughing, sometimes occasion the rupture of one or more of the small bloodvessels, the effusion from which scarcely ever fails to bring a degree of relief. In very severe attacks, and when the patient is much debilitated, he may be entirely unable to cough or expectorate; his sufferings from dyspnœa being, of course, proportionally greater and more protracted.

The symptoms thus briefly enumerated, being those connected immediately with the morbid condition of the respiratory organs, are not liable to any very striking variation, but occur with notable similarity in all the several orders of cases. The impression made by the attack, however, upon the functions of the general system, sympathetically, is diversified, as we would anticipate, by all the differences of constitution, habit, age, and temperament. In the plethoric and robust, the pulse will be found hard and frequent, and of large volume; the visage will be flushed and turgid, the eyes prominent and reddened, the tension across the thorax severely painful and urgent. In the feeble and aged, on the other hand, and when the disease has become habitual, we meet with a set of very opposite circumstances. The features are shrunk and contracted, the face pale or livid, the skin relaxed, moist and cool; the ears, nose, and extremities cold; the pulse low, small, and weak; the tokens of gastric and intestinal disorder are prominent; there are colicky pains, sometimes with tenesmus and diarrhœa; eructations of wind and acrid fluid, and, perhaps, nausea, with retching and vomiting of foul porraceous matters, and occasionally gastric spasm or cramp of the stomach, violent and painful, with or without hiccup.

Blood drawn during a paroxysm of asthma, is always dark. The urine is, for the most part, discharged frequently and copiously, being of light hue or limpid. Bree mentions a case in which it was always deep red or coffee-colored, for a short time previous to a paroxysm. I have had for many years under my care a female patient, in whom a troublesome incontinence of urine attends every attack.

The duration of the paroxysm is very uncertain. A remission of the more violent symptoms usually takes place with the return of morning, when the patient, languid and exhausted, falls into a slumber, from which he wakes unrefreshed, to pass a restless and uncomfortable day, teased with some remaining oppression of breathing, accompanied by slight but frequent cough. At night he is again attacked in the manner above described, and this alternate remission and exacerbation continue for a few days, four, perhaps, or five on the average, and then gradually subside and disappear. An instance is recorded in which this state of things lasted through seven miserable weeks.

The general *prognosis*, in regard to the result of a given paroxysm, is favorable. Suffocation, indeed, would seem to follow nothing less than a total closure of the air-tubes, and an absolute deprivation of oxygen, or its non-admission into the cells of the pulmonary tissue. A few instances, however, of immediate death in the paroxysm are related. Elliotson says in his Lectures: "I have seen people die from pure spasmodic asthma;" and goes on to give an example.

Yet we must not imagine that attacks of such violence should be repeated, without the most serious injury. The asthmatic may live to old age; but his life is languid and joyless; his muscles are weak and flabby; his digestive organs lose their tone, and his whole frame, bent and emaciated, gives evidence of premature decay and oppresive debility. He falls a victim frequently to hydrothorax, or universal dropsy; or his lungs become organically affected, and he dies of chronic bronchitis, or phthisis pulmonalis. One of the consequences, or attendants, of asthma, is the production of emphysema of the lungs. Its frequency is exaggerated somewhat by Laennec, who errs also, I think, in ascribing to it, as a cause, the phenomena of the paroxysm of asthma.

Autopsy.—Dr. Baillie had, before Laennec, correctly described this state of the organs. "The bronchial cells are found, after death, largely dilated, and do not collapse on opening the cavity of the thorax, the cells being enlarged, not only by this distension, but also by the breaking down of two or three into one; and there is also extravasation of air under the pleura, forming vesicles attached to the edge of the lungs." It is unnecessary to dwell upon the appearances presented after death in complicated cases, when there have been bronchitis and other pulmonary disorders and cardiac affections combined. Of course, the lesions will vary with the history of these. But in simple, or what Elliotson calls "pure spasmodic asthma," there is no change of structure traceable. In the case already referred to, he says: "No signs of disease were found; but the lungs were all distended, had lost their contractile power, so as to be unable to collapse, and were as light as a feather." Ferrus, quoted by Copeland, "after extensive experience, states that he has been unable to detect any lesions which can be attributable to uncomplicated asthma. Willis records a case of protracted asthma, in which no morbid appearances could be detected; and similar cases have occurred to Andral, Cruveilhier, and Bouillaud."

The *pathology* of asthma is, in the highest degree, obscure and uncertain. Cullen ascribes the disease to "accumulation in the lungs, or some fulness in their vessels." He observes, "that it depends upon a particular constitution of the lungs; that the proximate cause is a preternatural, and in some measure, spasmodic constriction of the muscular fibres of the bronchi necessary to a free and full inspiration, but gives also a rigidity that prevents free and full expiration. This preternatural constriction," he adds, "like many other spasmodic and convulsive affections, is readily excited by a turgescence of the blood, and other causes of unusual fulness and distension of the vessels of the lungs." Parr maintains, that "the proximate cause of the convulsive asthma, when complicated with the humoral, is a spasmodic constriction of the air-vessels of the lungs, occasioned by an increased secretion of mucus, from a relaxation of the mucous glands." Bree, a late writer of no little reputation, whose portraiture of this cruel malady is made more accurate and valuable, from his personal sufferings under it, takes a similar view of the matter, attributing the train of symptoms "to inordinate effusion from the pulmonary exhalants." Indeed, it has been common, for a long time past, to assign this supposed relaxation of the mucous exhalants of the lungs, as the sufficient cause of humoral asthma, which is the form chiefly taken, when the disease has become habitual by repetition. Wunderlich regards asthma as "essentially consisting in a transient and spasmodic constriction, paroxysmal, of the smaller bronchial canals; the larger, being cartilaginous, cannot be closed. It is connected with very various anatomical changes, as cause, coincidence, and effect."

McIntosh confounding it generally, like Laennec, with bronchitis, etc., admits the presence of some nervous irritation, "the nature of which is yet unknown. There is almost always something more in this disease than the original organic lesion; and I imagine no one can deny that asthma may be produced either in consequence of some diseased action in the brain, or in the nerves themselves which supply the lungs." Elliotson says: "The disease is literally pure spasm, and does not depend upon any organic cause." Watson, after arguing the question ably, at length comes to the same conclusion.

Both Reissisen and Laennec have shown that the bronchi possess a muscular structure, through the agency of which these air-vessels contract, when under the influence of spasm, at least, if not in ordinary respiration. The former traced these fibres in tubes of a very small diameter; the latter, in bronchial ramifications, less than one line across. Watson has demonstrated them "exaggerated by hypertrophy" in the large bronchi. Williams has proved that these fibres are contractile to a very considerable degree, under chemical, electrical, and mechanical stimuli; and Valentin declares that "the rings of the trachea can be made to contract visibly and distinctly, by irritating the par vagum." From all this Watson is led to infer that "asthma is one of the spasmodic disorders of the excito-motory system of nerves. The spasm may be either of centric or excentric origin; in the latter form the par vagum is doubtless the afferent nerve, and the impression it conveys to the medulla oblongata is reflected through the associated motor nerves to the bronchial muscles. The centric variety results from a similar impression, originating in the nervous centres, which respond mysteriously to certain feelings of the mind."

These recent views of the pathology of asthma were in good degree anticipated by the sagacious Cullen. My own opinions of the subject are built upon a similar basis; I do not doubt that asthma is often connected with pulmonary congestion and inflammation, but I regard it as essentially dependent upon spasmodic affection of the muscular fibres of the bronchial tubes, and this spasm, indeed, as its true proximate cause. I do not see that it is necessary to imagine these fibres to have become rigid uniformly in the state of complete contraction. Their rigidity in the intermediate condition accounts for the sense of constriction so much complained of, even when the passage of air does not seem to be greatly impeded, the blood being of florid color in the cheeks and lips. And, as Cullen has remarked, the patient complains quite as much, if not more, of difficulty in expiration as in inspiration. Some of the severest attacks of asthma present little indication of effusion within the lungs; the resonance upon percussion is loud, occasionally too great; the râle is sibilant and crepitant rather than mucous, and the solution of the paroxysm is effected with little or no expectoration.

The remote *causes* of asthma are various. They may be naturally enough divided into—1. Such as affect locally the respiratory organs; and, 2. Such as act upon them through the medium of the general system.

Of the first class, the most important, perhaps, is the proclivity derived from original peculiarities of structure, vicious conformation of the thorax and its contents, the lungs, heart, and large vessels.

This predisposition is of hereditary transmission; and in such cases the disease is very readily brought on, and specially unmanageable, both as regards violence and duration. When an attack has once occurred, it generates promptly a remarkable tendency to its own repetition. Habit has hence almost irresistible force in giving it permanency, or rendering it obstinately tenacious.

The second class of causes, those, namely, which act indirectly on the respiratory system, may generally be considered exciting or occasional. Among the most impressive are cold and moisture; exposure to sudden variations of temperature; inappropriate changes of dress; and, briefly, all such circumstances as give rise to catarrhal affections, with which, in this respect, humid asthma seems closely allied. Repelled eruptions are by several writers enumerated among the efficient exciting causes of asthma. The air of crowded rooms and other ill-ventilated places, will bring it on. Laennec ascribes it in one case to the exhalation—so offensive often in smell—of a newly-extinguished lamp. Many other exhalations and odors are accused of the same ill effect. It is recorded of several persons that they are seized with dyspnœa, quasi-asthmatic, upon breathing the effluvium of ipecacuanha. Of hay-asthma, as the English call it, I have spoken when treating of catarrhal fever.

The pneumogastric nerve may be excited either in the lung, as by bronchitis, catarrh, &c., or in the stomach; and thus we understand the production of paroxysms of asthma by dyspeptic disturbance and oppression.

Full meals, especially if of unaccustomed or indigestible food, are dangerous to the asthmatic. Late suppers are hurtful; so are violent exertions in speaking and singing, walking, running, leaping, and lifting weights. I have noticed in two patients, at least, a connection between electrical disturbances in the atmosphere, as in thunderstorms, and the repetition of their attacks. But when the predisposition is very strong, either originally, as in those to whom it has been hereditarily transmitted, or has been made so by habitual recurrence, the paroxysms frequently come on spontaneously, as the phrase is, or without the intervention of any apparent exciting or occasional cause.

Asthma is not often met with in childhood or early youth. I have seen it well marked and habitual in one subject under ten years of age, whose mother was nearly all her life a martyr to it. Its access is usually about the middle term, or between thirty and forty, unless when hereditary; in which cases it appears, I think, at, or soon after puberty. Cullen affirms it to be of more common occurrence in the male sex; but it has happened that fully two-thirds of the patients under my care and observation have been females.

Of the Treatment.—Like all other chronic affections, which have their periods of spontaneous remission and occasional recurrence, asthma is a fruitful theme of discussion with nurses and empirics, each of whom is possessed of some specific, or peculiar nostrum, by means of which infallible relief is promised, if not absolute and lasting cure. Relief, indeed, in some degree, greater or less, according to the contingencies present, may in the majority of instances be hoped for, and some palliation of suffering expected from our resources, if directed with skilful judgment; but a permanent removal of the malady and of the predisposition to its recurrence, is seldom—perhaps it would not be too much to say never—accomplished by art. It is affirmed to have disappeared in a few examples abruptly, permanently, and spontaneously—or under influences too obscure to be detected or pointed out.

The treatment of asthma is obviously divided into, 1st. The measures required to be pursued for the relief of the patient during the paroxysm; and, 2d. The remedial management best calculated to prevent its return, or at any rate to lengthen the intervals of freedom from dyspnœa. Our indications under the first head will demand to be modified to suit the circumstances of each particular case. In a first attack, the subject being of full habit and good constitution, and especially if there be evidence of bronchial inflammation or pulmonary engorgement, with febrile excitement, and a pulse full and hard, and a visage flushed and turgid, venesection is plainly called for; and the loss of a proper quantity of blood will take off the tension across the chest, and remove or palliate proportionally the oppression and difficulty of breathing. But we must not allow ourselves to be tempted to the too frequent repetition of this operation in any case, nor resort to it at all in instances of a character contrasted with such as I have just described, as in old, habitual attacks in persons debilitated, or far advanced in age. There is a degree of temporary alleviation which seldom fails to follow the use of the lancet, which will be apt to induce us to overstep the proper and prudent limit, and pay less attention than we ought to its probable ultimate effects. I have no doubt of the correctness of the old notion expressed by Dr. Parr, "that repeated bleedings in repeated fits, tend to hasten the common termination in dropsy." Where the remedy is insisted on or earnestly requested by the patient, we may avail ourselves of the knowledge of the fact that in such habitual cases, small bleedings bring about all the good results that can be derived from large losses of blood—nay, we are told by Dr. Whytt of an instance in which the paroxysm was put an end to by a mere puncture of the arm, the patient having been accustomed to expect ease from bleeding. There is rarely, if ever, at least in ordinary constitutions, any objection to the application of cups to the chest, either with or without scarification, their influence being, as I suppose, rather revulsive than depletory. Similar relief may usually be procured from hot mustard poultices, applied assiduously, upon the same principle of derivation or counter-irritation.

Emetics are very generally serviceable in asthma, and will be found applicable to a great diversity of the forms and conditions of the disease. I fully agree with Akenside, who is one of the warmest advocates for the use of the emetic, that it should be exhibited early. At the period of invasion, the dyspnœa is almost always associated with evident tokens of gastric disorder, such as nausea, flatulence, eructations of air and acid, straining to vomit, and the actual ejection from the stomach of foul and acrid matters. Nor is it merely beneficial by the removal of these irritating crudities; it appears to me to produce a directly relaxing effect upon the rigid and constricted bronchial fibres, and is farther the very best and most influential of our expectorants. Ipecacuanha is often preferred, but must not be offered until we have ascertained by inquiry that no idiosyncrasy exists to make it hurtful. The tartarized antimony, the sulphates of zinc and copper, the squill and the seneka, separately, and in varied combinations, have their advocates. I see little reason for any exclusive selection from among them, but regard the two latter as perhaps the best adapted to our purpose when a repetition of the emesis seems required. This may be advised if, after waiting an hour or two, the difficulty of respiration does not diminish.

These medicines will often act too upon the alvine canal, a few loose stools being procured; and usually with decided advantage. To insure this beneficial action, it is my custom to order a large warm laxative enema. After the bowels have been thus emptied, a glyster of assafœtida may be administered. Indeed, under the general impression of the spasmodic nature of the morbid affection here, the whole class of antispasmodics, as they are called, has been perseveringly experimented with, but, so far as I am to speak from my own knowledge, with no flattering success. Musk, valerian, ether, castor oil, etc., have had their advocates, but are now little if at all employed. Assafœtida alone retains any share of the confidence of the profession, and seems in some degree to deserve it.

In the class of narcotics, we find several valuable remedies for asthma. Of these I do not hesitate to give the first place to opium, although its employment has been a subject of severe animadversion. When properly managed and well-timed, it is always useful. The earlier symptoms of circulatory excitement being reduced, the gastric oppression removed, and expectoration promoted by the emetic, I know nothing so well adapted to relieve as a full dose of opium. Combined with ipecacuanha, as in the Dover's powder, or with camphor or nitrous ether, it determines well to the surface, renders the cough less harassing, and the expectoration easier: there is relaxation of the pulmonary constriction; the dyspnœa subsides, and a quiet refreshing slumber comes on.

The lobelia inflata has long been prized as a remedy in asthma. Elliotson speaks favorably of it. I have employed it often in the early stages of an attack, to procure easy vomiting and expectoration. It is asserted, however, by many to give relief specifically and completely, before occasioning any evacuation.

The datura stramonium is considered by some asthmatics an invaluable remedy. It is commonly smoked like tobacco, the dried plant entire, cut up and burnt in a common pipe. It is not irrelevant to remark here that in Williams' experiment upon animals, the air-tubes in the lungs of those killed by stramonium exhibited a striking defect of contractility and absence of contraction on the application of galvanism.

Tobacco is serviceable to some as a relaxant and expectorant. In the interior of North Carolina, the leaves of the black sumach are used for that purpose in asthma. Some of my patients drink largely, and with benefit, of strong coffee. The spider's web has been prescribed successfully by Webster and Robert Jackson.

Inhalation of various airs or gases is less resorted to, I am persuaded, on account of the difficulty of preparing them, than from any want of adaptation or efficacy. Many find relief in filling the apartment with the fumes of paper previously soaked in a solution of nit. potassa and burnt. Some prefer the fumes of burning resin; others breathe common coal smoke. Chloroform gives decided relief in the dry, nervous or spasmodic asthma, but is less adapted to the mucous or humoral attacks. I should hope for benefit from the nitrous oxide or exhilarating gas.

Galvanism was introduced into the practice here by Wilson Philip; he found it most effectual, he tells us, in old habitual cases of humoral asthma, in which he declares it will scarcely ever fail to produce immediate results, remedial or prominently palliative. I have seen it several times, even when imperfectly applied, give immediate relief to the habitual asthmatic. Watson says that he once saw it bring on an attack. This, to a homœopathist, would only be an additional fact or argument in its favor. An eclectic would not regard it as a serious objection to its employment.

During a paroxysm, the chamber of the patient must be well ventilated, and kept at an equable and comfortable temperature. No ligatures should remain about his person. His feet must be warmed, and the surface of the chest and epigastrium irritated by revulsives.

The second indication in the treatment of asthma is to prevent the recurrence of the paroxysms of dyspnœa, or, failing in that, to increase the length of interval between them and diminish their force.

If possible, we must ascertain and enjoin an avoidance—as far as possible of—the causes which predispose to, and excite an attack. Great care should be taken to evade such exposures as bring on catarrh and bronchitis, which tend to usher in a paroxysm and then aggravate and prolong it. An asthmatic should wear flannel next his skin, and woollen stockings.

In many subjects, an undigested meal, of food either inordinate in quantity, or of improper quality, or taken at an unaccustomed hour, will bring on a fit of asthma. Some are similarly assailed if they indulge in any passion or excess. In not a few, the malady is associated with some permanent derangement of the digestive organs, the nature of which should be carefully inquired into, and a proper management advised. It is in examples of this nature that we find recorded so many eulogiums upon different modes of alterative treatment. The hydriodate of potass, introduced by Casey, is highly approved by Deane. A slow mercurial course is recommended by some. Moderate purging long persisted in, after the manner of Hamilton and Cooke, who was led to it by his exclusive theory of venous and portal congestion, is said to have done wonders. It is in similar instances that the Cheltenham waters in England, and those of Saratoga and other cathartic springs in our own country, have gained so much reputation. I have seen this plan, which is not unattended with danger if promiscuously followed, of most advantage in subjects in whom the thoracic oppression was connected with fulness of abdomen, jaundice, or dyspeptic symptoms.

In these latter, the dyspeptic, and in the obviously anemic subjects of asthma, tonic remedies are absolutely required. Cinchona may be used with advantage. Sound wine is often serviceable. But the mineral tonics are generally necessary, and of these iron in its several forms of preparation deserves the preference. The Chalybeate Springs are often highly beneficial, and a visit to them should be advised. Of the officinal formulæ, I prefer the acetated tincture.

External revulsion by counter-irritants is universally trusted to, but I have not seen the decided advantages which the books teach us to expect from their persevering application. The pustular inflammation from tartar emetic—that from croton oil or from ipecacuanha may be tried, and will benefit such patients as labor under the complication of chronic catarrh or bronchitis, but I think them little adapted to make any impression upon "pure nervous, or spasmodic asthma." The same remark will apply to the establishment of perpetual blisters to the chest, and the insertion of issues or setons over the ribs, or in the arms, or on the back of the neck; and to the attempt to reproduce repelled eruptions which the patient may have got rid of, and the reopening of old ulcers that may have healed or dried up.

But above all prophylactics, in the case under consideration, change of air will be found, in the majority of instances, most efficient. Asthmatics differ much in the choice of situations, but they are generally, I think, more at ease in low, flat districts of country upon the sea shore, and on the banks of rivers, than in higher and dry sandy or mountainous regions. The atmosphere of cities, too, will be remarked, for the most part, to deserve a selection in preference to that of country places—I scarcely know for what reason. With regard to this matter, however, each patient should be encouraged to observe and judge for himself, and to choose for his permanent residence that spot in which he breathes most comfortably.

PERTUSSIS.—*Tussis Convulsivus*—*Bex Convulsiva*—*Chin-cough*—*Kinck-cough*, and *Hooping-cough*, are the names by which this singular affection is known, each of which appellations is significant of some circumstance in its history or character. The first three refer exclusively to the violent and spasmodic cough, which is its most prominent and essential symptom. The term chin-cough has been variously derived; by Good it is written kind-cough, and traced to the Saxon "kind," a child, as being chiefly met with in early life; by others it is regarded as an allusion to the paroxysmal severity of the cough. In Scotland, the disease is called kinck-hoast; and the word kink is used in all the northern parts of Great Britain, and in some regions of our own country, to denote vulgarly a fit or paroxysm. Its most common title among us—hooping-cough—is affixed to it on account of the sonorous or hooping inspiration which attends the strong effort in coughing.

Pertussis is almost universally ranked among the specific contagions. Cullen defines it "morbus contagiosus, tussis convulsiva, strangulans, cum inspiratione sonora, iterata, sæpe vomitus." The common consent as to its contagious character, is broken only by the doubts suggested on the subject by Laennec and Desruelles, in France, and the decided opposition, in our country, of Caldwell. It is often traceable distinctly from subject to subject. In towns and cities of dense population, it occasionally becomes epidemic, as the phrase is. It is affirmed to appear occasionally, even in remote country places, without obvious source, as is equally true of measles, mumps, &c.

Like most of its congeners, it affects its subjects but once, and, hence, is looked upon as a disease of children specially. Yet it is supposed that, besides this, the adult is less liable to its influence, though not entirely exempt from it. Dr. Heberden declares in his commentaries that he saw a woman of seventy, and a man of eighty years of age, afflicted with it. In its incipient stage, hooping-cough can scarcely if at all be distinguished from catarrh or common cold. Hence, in making up our opinion as to the nature of any particular instance, we must take into consideration "the epidemic constitution of the air," or the prevalence of the contagion within the neighborhood. In the mildest class of cases, indeed, it cannot positively be determined by any diagnostic. More usually, however, after commencing with an ordinary cough which continues for a few days, a week, or a fortnight, harassing principally by its frequency, we observe the paroxysms to come on less often, to be more violent, and to become protracted; the expirations are quick, involuntary, convulsive, and repeated in long ccession; the face flushing, and the eyes protruding, being reddened d watery—the little patient seeming almost exhausted and suffocated, til he is at last able to effect an inspiration, which is rapid, deep, norous, and attended with a loud hooping noise. After a time a large quantity of thick, tenacious mucus is expectorated, or vomiting ensues, with great though temporary relief. These fits of coughing return at various intervals, shorter or longer, according to the severity of the attack; the respiration, in the meanwhile, is seldom entirely free from disturbance, though in light cases the child will return immediately to its play. Examination of the thorax detects a loud mucous râle, with crepitation, and cooing or purring in most instances, and the breathing is generally hurried and irregular. A majority of subjects present the complication, if it be one, of bronchitis and true pneumonia, when, of course, we shall discover the physical signs of these conditions. This state of things is said to occur uniformly in attacks taking place in more advanced life. A child soon becomes aware of the approach of a paroxysm, and runs to some one for support, or catches hold of a chair or table. The cough when more vehement than ordinary, may bring on epistaxis or terminate, as I have seen, in a pulmonary hemorrhage. One little patient of mine, æt. 4½ years, brought up a considerable amount of blood, apparently from the lungs, at every fit of coughing. These are more apt to be specially violent at night, the exacerbations of fever being then most perceptible, and the general suffering aggravated in a great variety of modes. After such severe paroxysms, the patient remains for some time languid and weary. "Adults," says Heberden, "concidunt—fall at once, conquered in a moment, by the accession of the paroxysm, but recover immediately; and this sign or mark is proper to, or characteristic of, the affection in them."

Pertussis is essentially pyrectic. It is true, that in ordinary or mild attacks, the tokens of vascular excitement may not run so high as to attract attention; yet I fully agree with Watt, who declares that "even in the lightest cases, as long as the kinks or paroxysms continue, there is always some part of the day when the presence of fever can be detected. It may hardly deserve notice, but still, to a careful observer who has opportunities of seeing the patient day and night, it is abundantly obvious." "I have remarked it," he goes on to say, "even in those favorable cases where the appetite continued good throughout, and where the patients seemed to suffer little or nothing in their general health."

The febrile exacerbation, as I have hinted, usually takes place in the evening, and is protracted through a considerable portion of the night. In the severer cases, where pulmonic inflammation has distinctly supervened, this symptomatic fever assumes an almost continued type, with scarcely any notable remission, for days together. The stomach and bowels seldom fail to become more or less disordered. Those seem to suffer least, however, in whom the paroxysm is apt to end in free evacuation of the stomach by vomiting. In hot climates, and in autumn, the diarrhœa which occasionally attends, is a very obstinate and troublesome symptom. Convulsions not unfrequently happen especially where the subjects of hooping-cough are engaged in the process of dentition.

The exciting *causes* which tend to produce and aggravate the paroxysms of coughing, are, a full meal, violent muscular exertion, mental emotion, a fit of crying, exposure to a current of cold or damp air, or to any irritation of the fauces or trachea from dust and the like. The duration of pertussis is exceedingly uncertain, varying from a fortnight to three or four months. It seems, sometimes, to take on a habitual persistence, and is liable to renewal after having subsided, being in this way susceptible of almost indefinite prolongation. Dr. Percival tells us that it occasionally assumes a periodical character, in which form it is singularly unmanageable and tenacious.

The general prognosis in this disease is favorable; the proportion of mortality not being great under ordinary circumstances. It varies with the age of the subject. Between six months and three years of age four-fifths die of those carried off by pertussis. Children of scrofulous or asthmatic parents are said to suffer peculiarly under attacks of hooping-cough. I have observed this to be strikingly true of such as have previously shown any marks of strumous disease, in whatever form.

The individual prognosis must be drawn from the severity and frequency of the paroxysms ; from the condition of the respiratory organs, as exhibited during the intervals; and from the nature and intensity of the accidental complication with other disorders. Comparative freedom from fever, easy respiration, the occurrence of vomiting when the cough urges, and abundant mucous expectoration, are among the most favorable symptoms. It is a common belief that the danger diminishes as soon as the hooping or sonorous inspiration attends the cough; but this is an error.

In bad cases, on the other hand, we have panting, dyspnœa, orthopnœa, stricture across the chest; in very young patients, suffocation may take place, from their inability to bring up the oppressive amount of mucus effused in the air-passages. Hence, in these, the effort of vomiting is so useful and desirable. We meet occasionally with hemorrhage, as the consequence of the vehement paroxysm of coughing. I have mentioned a little patient in whom every fit during the night brought on a discharge of blood from the lungs; yet she ultimately, though with great difficulty, recovered. If the paroxysms are attended with strong determination to the head, as happens not unfrequently, the face becomes flushed and turgid, nay, sometimes livid and purple, and blood gushes from the nose. Under such circumstances, we must dread the supervention of convulsions; or, if these be warded off by repeated epistaxis, a dangerous debility ensues. The incidental complications of pertussis sometimes assume the prominent place, and become of paramount importance. Thus the gastric and intestinal irritation, which so commonly attend, run high in unfavorable seasons. I have seen diarrhœa twice fatal in subjects of hooping-cough, in a hot and moist August, in a malarious locality, the patients (black males) having attained the ages of thirteen and sixteen years.

The *pathology* of hooping-cough is obscure. There exists in the mucous membrane of the whole respiratory apparatus, a very peculiar irritability, morbid in nature and intense often in degree, which gives rise to vehement paroxysms of convulsive cough, and is attended by, or productive of an inordinate determination of blood to the organs affected; this, in its turn, results either in oppressive congestion, or a positive inflammation, with its disastrous consequences.

Desruelles regards the disease as in itself, and originally, a complex irritation of the brain and of the bronchial membrane, and proposes to term it a broncho-cephalite. He believes the respiratory affection, however, to be the primitive, and the cerebral to be the consecutive element.

Dr. Watt, of Glasgow, from whom we have a useful treatise on this subject, describes the appearances on examination of several bodies dead of pertussis, among whom, we learn with painful sympathy, that two were his own children, as distinctly showing an inflammatory affection of the pulmonary mucous membrane; and goes on to conjecture that "hooping-cough consists in some eruptive disease of the mucous membrane of the air-cells and bronchi, so minute as to escape ordinary observation, yet so considerable as to excite inflammation."

It is also affirmed that hyperæmia, congestion, inflammation of the brain and its membranes, are among the ordinary changes found to have taken place in bodies dead of pertussis. Yet these views of the inflammatory nature of the disease, though perhaps supported by a large majority of the profession, have not been admitted without dispute. Among others, Dr. Granville maintains, in very definite terms, the opinion that "hooping-cough is never, in itself, an inflammatory disease. "No traces of inflammation," he distinctly affirms, "have been found in the respiratory organs of those who have fallen victims to it—and that even when the complaint has been violent, and has lasted a great length of time." "The only tokens of inflammation," he says, "have been found in the brain, as the result of strong and repeated spasms of the organs of respiration producing a great determination of blood to the head." The condition of the spinal cord has not been examined with proper care in cases of pertussis. There is much reason for the conjecture of M. Hall, that all spasmodic or convulsive affections have their seat in this portion of the nervous system.

Sanders and Pidduck maintain that pertussis depends upon "a congested state of the vessels at the origin of the pneumogastric and other respiratory nerves, and around the medulla oblongata." Hence, they declare, the uniform success of leeching and applying counter-irritants at the junction of the occiput and atlas, and down the neck and between the shoulders.

The *pathology* of pertussis is thus seen to be unsettled and obscure. It is, I conceive, in the first instance a specific irritation of the bronchi, nervous and spasmodic, but readily becoming phlegmasial. In protracted cases, *emphysema* of the lung is almost certain to ensue, which tends to keep up the respiratory uneasiness. Collapse of a portion of the lung is affirmed to be frequently met with, and it is suggested that emphysema may be regarded as a complementary or contrasted condition. But it is fully accounted for by the violent expiratory efforts so protracted and convulsive. Beyond this the complications observed are not uniform or essential, although interwoven closely and often.

Of the Treatment.—The profession in general, whatever may be their theoretical opinions on the subject, appear willing practically, to admit the futility of any direct endeavor to put an end to, or get rid of the attack of this strange malady. Like certain others of the specific contagions, it seems beyond the power of our art absolutely to arrest its progress, and we content ourselves with the fulfilment of humbler indications. We aim to moderate the violence of its symptoms; to obviate its injurious tendencies; to prevent all lesion of organs assailed in its course; and while on the one hand we diminish the vehemence of morbid action, on the other, we sustain the vital energies in resisting its ravages. I have already spoken of the modifications of our therapeutical management necessary in the various classes of disease known as *self-limiting* and *unlimited.* Pertussis holds, as I have stated, a sort of middle place between them. Arising, as it undoubtedly does, from a specific contagion, it seizes an unprotected constitution with so forcible and tenacious a grasp, as not to be shaken off with any possible effort, until it has wrought in the system certain changes entirely inappreciable, but sufficiently impressive to destroy the liability of the subject to any future attack. Its duration, however, is not like that of measles and smallpox, precise and definable; we know not its periods of increase, maturity, decline, and subsidence. Hence it is reasonable that we should keep in view, though we cannot make it our principal purpose, the abbreviation of the attack, and I do not doubt that we can effect a good deal in favor of our patient, by judicious efforts of this kind. I believe, however, that our success will depend not more upon our medicinal prescriptions, than upon the institution of a proper regimen and correct general conduct of the case, so as by the avoidance of all occasional excitement or superadded irritation, and by the prevention of any undue complications, to reduce the disease to its minimum limit of spontaneous existence.

A very large proportion of the severe attacks of pertussis commence very much as catarrhal fever—with pain or stricture of the chest, dyspnœa, and harassing cough, attended with febrile movements of greater or less violence, full, hard pulse, headache, pain in the back and limbs, red eyes, flushed face, &c. Depletion is obviously necessary here, and venesection is advised by some practitioners. This may be necessary, but rarely. It is safer, more convenient, and generally efficient enough to take blood topically from the chest by leeches or cups, if required.

Purgatives are very generally demanded both to reduce the excited febrile action and to correct the disordered condition of the digestive organs which is so uniformly present in the early stages of pertussis. The milder articles should be preferred, and their use persisted in for some time, until the pulse is brought down, the determination to the head relieved, and the general symptoms improved.

At whatever stage of the attack, it will be advisable to resort to emetics if there be much dyspnœa, mucous râle and other evidence of accumulation of bronchial secretion. They are our best expectorants, especially with children, who are with great difficulty made to spit. They determine well to the surface also. I am not fond of the antimonials, which act harshly on young subjects. Squill, besides its merely emetic and relaxant operation, seems to affect directly the pulmonary exhalants, and is thus specially useful in promoting expectoration. Ipecac. superadds an evident antispasmodic influence, and is a good sudorific. A similar combination of powers has been ascribed to the sulphate of zinc, which has been employed freely and largely, and which is, without question, highly serviceable. The efficacy of each of them is assisted, and their advantageous action promoted by the use of the warm bath, which will be found an admirable auxiliary, at every step of our treatment of hooping-cough—determining to the surface, relaxing spasm, subduing pulmonary constriction, and promoting expectoration; and in all these modes, contributing largely to the relief of the little sufferer, from the most distressing of the symptoms which assail him.

We must not omit the assiduous application of warm fomentations to the chest, and poultices, with or without mustard. These form our best modes of local relief, in the first instance, while fever is high and the skin hot, and the pulse full. When the general excitement has been somewhat diminished, and these less impressive appliances have lost their effect from repetition, we may in threatening cases derive benefit from epispastics. They should be laid on different parts of the thorax successively, and although they must occasion some inconvenience and discomfort to the little patient, this is more than counterbalanced by their revulsive efficiency.

Thus far I have been speaking of the incipient conditions of pertussis, while yet its influences have been diffused over the universal system, and its invasion has presented no features which may avail to separate it definitely from catarrhal fever on the one hand, or acute bronchitis on the other. We now come to consider its characteristic history, after the peculiar nature of the spasmodic or convulsive affection of the respiratory apparatus, in which it specifically consists, has become prominent and fully developed. The patient may seem perfectly well in the intervals between the attacks of cough; may eat heartily and sleep well; may recover strength, and repair lost fulness of habit; yet, from time to time he is reminded of his tenacious tormentor, by the recurrence of irresistible irritation in the trachea and lungs, which brings on a most harassing series of involuntary and forcible expirations, so quickly repeated as to impede the long-desired inspiration, until, at last, after many laborious efforts, a loud sonorous hoop attests his success; and this struggle may be renewed for many times, with such violence of exertion that the blood shall gush from the nostrils, and the purple visage, the bloodshot eye and swollen eyelid, and the hemorrhagic expectoration, all bear witness to the severity of the attack.

Under such circumstances as these, anodynes and antispasmodics are obviously indicated, and universally resorted to. The whole class of narcotics have been, in their turn, employed here, extolled, abused, and neglected. Hyoscyamus, cicuta, and stramonium have had their day and their advocates, but are now little depended on. Opium alone, retains the confidence of the modern practitioner, and when judiciously prescribed, will be found of invaluable utility. It is specially useful in two of its combinations; with ipecacuanha, as in the admirable Dover's powder, and with stimulants and aromatics, the camphorated tincture, the ancient familiar paregoric elixir, a domestic remedy of almost unequalled power, in calming irritation, relieving cough and dyspnœa, and procuring rest. I need hardly remark here that the use of opiates should be preceded always by proper antiphlogistic and depletory treatment in inflammatory attacks. A neglect of this precaution has occasioned much blame to be heaped on the remedy which properly belonged to the physician who advised it under improper circumstances.

Of the antispasmodics, properly so called, castor and musk, once extensively relied on, are fallen in almost entire disuse. Assafœtida is much employed among the common people, and highly recommended by some practitioners. A watery solution seems to be preferred. The oil of amber has enjoyed some reputation, but it is now abandoned, except as an ingredient in the preparation of the tinct. mosch. fact. This is with me a very favorite remedy. I seldom fail to find it of obvious service, and its efficacy extends widely to all varieties of spasmodic cough, whether occurring in children or adults. It has lost its value in the hands of many practitioners, from being exhibited in too small amount. We obtain no useful results from it unless given in full dose (ten to twenty drops), repeated as often as may be required. I am not aware that any ill consequences are ascribable to it in any quantity; as far as I have observed, the effect of an over-dose to an infant is, to bring on easy vomiting, which, in the case before us, is rather a beneficial than injurious operation.

In this connection I may speak of the Prussic acid, though it is hardly decided whether we are to class this impressive agent among antispasmodics or narcotics. The testimonies which have been adduced to establish the success of its application in pertussis are numerous and of unequivocal character. Dr. Oliver, of Salem (Mass.), who claims to have been the first to use it here, recommends it as the most prompt and effectual of all the remedies of hooping-cough. Dr. Granville, who has written much and enthusiastically concerning this acid, goes so far as to declare that "no case of hooping-cough need be suffered to proceed longer than eight or ten days, if timely and judicious recourse be had to it." These encomiums seem to me not a little extravagant. Yet I am willing to rank the Prussic acid among the most available of our palliatives in pertussis. A single minim of the acid of the shops, and its equivalent in the other formulæ (among which I am much in the habit of using the aq. amygd. amar.), is the dose for a child aged one year, and onwards in the same ratio.

Nitric acid is recommended by Arnoldi, and highly eulogized by McNelly, of Tennessee. Diluting the acid, and sweetening it to resemble lemonade, the latter gave as large a quantity as the patient would drink. Of eight cases thus treated, he says all were well in two weeks, except one who would not take it freely. Being urged, and yielding, she also got well in a week. (*Trans. Amer. Assoc.*, vol. vi.) Nitric acid, in its action upon the oil of amber, produces the factitious musk which I have always regarded as one of our most efficient remedies.

Pearson and Paresi, in modern times, have revived the employment of the cochineal, so much confided in during the last generation. The evidence in its favor, as a specific, is certainly strong. It is given in combination, usually, with the carb. potassæ, as thus: ℞.—Carb. potassæ ℈j, powdered cochineal gr. x, sugared water ℥iv. M. S.—A teaspoonful every two hours.

Dr. E. Watson treats the cases by "the local application to the pharynx and larynx every second day, of the solution of nitrate of silver." His patients, he says, "ceased to hoop in about ten or fourteen days;" and afterwards speaks of a favorable termination in from two to six weeks. He has treated fifty-seven cases: Joubert sixty-eight. All of them were benefited except eight. These received no injury, and there occurred no death among them all.

The alkalies are the bases of a very large proportion of the prescriptions in general use, either domestically, or in the hands of the regular practitioner. An alkaline solution is made the vehicle for the assafœtida of one, the musk of another, and the cochineal of a third. Throughout the whole course of the malady, a greater or less degree of gastric and intestinal derangement is evidenced, by the morbid alvine evacuations, the sour and fetid breath, and by the swelling and hardness of the belly.

I am in the habit of preferring the carb. potass. to a weak solution of which the tinct. mosch. fact. and the tinct. op. camph. are added in proper amount. Castor oil or rhubarb should be given *pro re nata*, if the bowels are confined, and the tinct. kino if too loose. Under these latter circumstances, we may resort to the acetate of lead, which is not, indeed, limited to this contingency, if we may believe the favorable reports of writers who speak of it; Sauvages, Rush, and Barton, all regard it as possessing some specific efficacy in the treatment of pertussis; but I confess that I have failed to obtain any striking advantage from it, except as an astringent.

The tinct. cantharid., anciently employed among the English, is a favorite prescription with some physicians. It is not much used, as it is harsh and severe in its operation, its good effects seeming to depend on the strangury produced by it; this revulsive and painful irritation of the neck of the bladder being substituted for the morbid affection of the respiratory apparatus. Certain of the tonics have been supposed to exert a beneficial influence in hooping-cough. They are obviously adapted to the latter stages of the disease, when the sympathetic derangements of the general system, which have accompanied it, have subsided, and its protraction appears to be occasioned by the mobility of feebleness, or to grow out of the tenacity of habit. Cinchona is placed by Cullen at the head of the list, and seldom fails, indeed, to show a salutary power. The infusion I think the best mode of exhibiting it, made aromatic and diaphoretic with the serpentaria, which improves its efficacy.

I do not deny the greater impressiveness of the sulph. quinine, but from its intense bitterness, and incapability of disguise, it is extremely difficult to administer it in sufficient quantity to young children. This observation will apply likewise to all the other bitter tonics, such as colombo, quassia, gentian, etc., whose good effects are in a great measure lost or counterbalanced by the extreme reluctance and disgust with which they are taken. The metallic tonics are free from objection. Zinc, iron, and arsenic, are used; the latter is particularly convenient, as being tasteless and inodorous, and thus very easily administered to the most unmanageable patient. It is the subject of very strong eulogy from Dr. Ferriar, who declares his belief, that "the only remedy which promises to shorten the disorder effectually, after the proper preliminary steps have been taken, is the solution of arsenic."

The general management of the patient should be carefully regulated. His diet should be light, nutritious, and unstimulating. He should be warmly clad, and protected from vicissitudes. There is a popular prejudice in favor of exposure to the open air in hooping-cough, which does injury, if yielded to, while there remain any of the complications with bronchitis and pneumonia, so common. These require confinement, not only within doors, but to the equable warmth of a well-ventilated chamber, or even, for the time, to bed.

In serious and protracted cases it may be found necessary to advise change of air, or, at any rate, a temporary removal from an accustomed residence. A contrasted locality should be sought. The lowlander may be sent to the mountains, and the native of the interior country brought for a time to the sea shore.

SECTION IV.

DISEASES OF THE SENSORIAL SYSTEM.

THE organs of this important system are the brain, the spinal cord, and the nerves; the diseases of which must be considered in succession.

Their functions are varied and numerous, and essential both to organic and animal life. Intellection, including sensation, volition, and all forms of mental action and passion; motivity, in both the voluntary and involuntary muscular fibres; secretion, nutrition, circulation, and, indeed, all the specific actions of all the viscera and tissues, are absolutely dependent upon, or inevitably modified by their condition.

Some portions of the intracranial mass, the "hemispherical ganglia," are exclusively devoted to intellection; the offices of "the true spinal cord" are purely physical; the nerves seem mere conductors of sensations, volitions, and impulses direct and reflex, between the nervous centres and their extremities. These centres are supposed to be sources of nervous power, which is generated, probably too, by the organic or nutritive action of all the tissues. The gray vesicular, and the white tubular matter, exist together in the brain, spinal cord, and ganglia; the nerves consist of the white only.

Nervous matter is composed of albumen in combination with phosphorus and certain fatty substances.

The disorders of the various departments of the sensorial system must of course express themselves by prominent impairment of the special function of the portion affected; this is not always clearly known, however, and the connection between them all is so close, that for the most part the lines of demarcation cannot be drawn with absolute certainty or precision. Nay, we must confess that in many instances they are so thoroughly intermingled that our efforts at nice separation result in nothing more than a selection on doubtful grounds of mere preference, theoretically. Following, with this preliminary remark, the familiar distinctions, we recognize the various affections of this great system, as prominently seated in some special portion of it, and treat of them under the separate heads of *Cerebral*, *Spinal*, and *Nervous*:—and first of those of the BRAIN and its membranes.

CEPHALALGIA (*Hyperæsthesia of the Brain*, of Romberg—*Headache*) is one of the most frequent and painful of human maladies. It attends most febrile ailments, depending on the irritation, congestion, and inflammation, which belong to the history of these affections; and is sympathetic of, or caused by, many gastric derangements.

When idiopathic, it seems to consist of a peculiar erethism of the brain, which may be extensive, spreading over the head, or limited to one side (hemicrania), or confined to a single narrow spot. Most persons habitually subject to it have it usually at some particular point.

Its *causes* are direct and indirect; prolonged and intense impressions of light and sound; strong thought, violent emotion or passion; solar heat, or the warmth of a crowded apartment, are among the first—so is the motion of a ship or a swing—so, too, want of sleep—the effect of tobacco, opium, wine, and other stimulants and narcotics. The indirect are found in the disturbances of the digestive system; chiefly acidity of stomach and constipation. The idiosyncrasies of the subject, and the contingencies with which it is connected, modify it somewhat, and give it a qualifying title—as nervous, sick headache, hysteric headache.

It becomes, by repetition, almost habitual in many, and returns upon the application of the slightest causes.

Pathology.—Hemicrania is ascribed by Turenne to compression of the facial nerve, especially the ophthalmic branch, by congestion in the sinuses at the base of the cranium. The attendant nausea is caused, he thinks, by the compression of the eighth pair at the foramen lacerum posterius. Each pulsation of the carotid increases the pain; epistaxis relieves it. Inspiration, during which the venous blood tends towards the heart, diminishes it. The left side is most affected. These views correspond closely with my own observation and experience. The history of the causes which produce the attack, and the general means of relief, both favor his conclusions. Sieveking finds cephalalgia connected with anemic as well as congestive states of the brain.

Treatment.—Its natural cure or termination is in profound sleep, yet the employment of narcotics is productive of less benefit than would hence be expected.

Much palliation is effected by enjoining perfect stillness and quiet. A cold wet cloth applied to the head gives relief.

Holding the arms elevated above the head, as advised in epistaxis, by favoring the flow of blood from the seat of congestion is often found useful; so is the repetition of full inspirations, long protracted, alternating with deep expirations. Parry recommends the compression of the carotid of the affected side with the finger, so as to impede the force of the current of blood driven upwards; and I have certainly found it of some benefit.

Trousseau and Bonnet treat cephalalgia, both pyrectic and apyrectic, successfully, as they affirm, with the *cyanuret* of *potassium.* They use the solution externally—six or eight grains in an ounce of water, alcohol, or ether—the first in preference; this amount will ordinarily suffice for a day, but it may be necessary to double the strength or the quantity used. It may be applied to the sound or the blistered skin. Compresses wet with it, or a wad of cotton laid on the part, must be renewed as often as they become dry. If used on the denuded skin, it must be guarded with cerate, on account of its causticity. When applied, the solution produces a decided sense of cold; in half an hour a prickling is perceived, and a kind of itching, not disagreeable. The skin becomes red, especially if the alcoholic solution is used. If too strong, or kept on for more than twenty-four or forty-eight hours, eczema follows.

Great care should be taken to avoid all obvious exciting causes, or apparent sources. When this cannot be done, the system should be gradually accustomed to them, guarding against any unfavorable circumstances of predisposing character, such as indigestion, costiveness, and the like. Camphor and belladonna have been supposed to exert some specific good effects in the relief of constitutional headaches, and may be employed in small doses. The best remedy is found in the annealing or hardening influence of long and frequent journeys, in which discomfort to moderate extent is incurred.

I have seen many experiments made with very powerful agents of sedation and counter-irritation, for the relief of this tormenting malady. The inhalation of chloroform has been in some very useful, inducing sleep, from which the patient wakes relieved. In others, I have seen it do much harm, prolonging and increasing the headache. Aconitine is equally irregular and uncertain in its effect, and attended with some serious risks besides.

PHRENITIS.

Phrenitis—Meningitis—Encephalitis—Inflammation of the brain and its *investing* membranes. I treat of these together on account of the universally acknowledged difficulty of distinguishing between inflammation as it affects the cerebral substance on the one hand, and on the other, of the membranes which invest it. In the acute stage the symptoms are nearly, if not absolutely the same; the result is chiefly the same, implying a degree of pressure upon the various portions of the intra-cranial mass, which goes to confuse very much by its progressive influence, all nice diagnosis.

Acute phrenitis is not often met with as occurring idiopathically or independently, but many of its phenomena arise sympathetically, in the course of other diseases; and in the class of fevers this is so generally the fact, that Clutterbuck and others have maintained cerebral inflammation to be the primary location and essential condition of fever, properly so called.

Acute inflammation of any portion of the brain and its membranes, commences with pain in the head, with a sense of fulness, heat, and throbbing; the eyes are red and suffused, and intolerant of light; the face is flushed and turgid; there is pain in the back of the neck and down the spine; the scalp is occasionally tender to the touch; the stomach is in some cases oppressed with retching and vomiting; the pulse is full, hard, and bounding; there is great anxiety or mental dejection, or, even from the first, wild delirium, which at any rate seldom fails to supervene early in the progress of the attack; the hearing is acute, and ordinary sounds occasion distress; there is pervigilium; the tongue is whitish, and slightly furred; and the skin hot and dry. If the disease advance unchecked, the patient sinks into a soporose state; the eyes grow less and less sensible to light; there is perhaps strabismus, or a fixed state of the pupil, at first contracted slowly, and afterwards widely dilated; the hearing is impaired; there is sighing, grinding of the teeth, tremulous debility; respiration and deglutition become difficult, and coma or convulsions precede death.

The *predisposition* is said to be sometimes hereditarily transmitted. It is found to exist in men of violent and irritable temper, and morbid susceptibility to mental emotion; in persons of sanguineous temperament; those accustomed to free and luxurious living; and in the profound student and ardent cultivator of literature.

The exciting *causes* are insolation, blows on the head, gusts of vehement or prolonged passion, and intemperance or excess.

Autopsy.—The appearances after death vary with the duration of the case. The vessels of the brain and its membranes are turgid; lymph is found adhering to the surfaces of the latter, and connecting them by adhesions; serum is often effused over the surfaces and in the ventricles, and pus not unfrequently found mingled with it in considerable quantity. The seat of meningitis is the loose, areolar, subarachnoid tissue, rich in bloodvessels. The exudation here is usually puruloid, consisting of pus-corpuscles chiefly mingled with loose granules and molecules, and some serum. The serous effusions, I agree with Bennett, belong to the class of dropsies rather than inflammations. Acute cerebritis will be distinguished pathologically by the exudation of liquor sanguinis into the substance of the brain, whence abscess in the more rapid cases and softening in the slower. Softening is of several kinds; besides this inflammatory softening, we have the hemorrhagic, occurring round a clot, and a species probably independent of inflammation, a vice of nutrition, or lesion from diminished nutrition in a part of the brain from obstruction by a clot of blood, the emboli or embolismus of Virchow. Induration attends rather upon chronic than acute cerebral disorders.

The *prognosis* is generally unfavorable. We draw the most gloomy inferences from the supervention of great debility, while the local excitement is unabated, and from the tokens of effusion and mechanical pressure, as paralysis, strabismus, deafness, stupor, coma, convulsions.

Treatment.—Bloodletting is, in the early stage, indispensable. Some open the temporal artery, some the jugular vein. That vessel is to be selected from which we can obtain the fullest and freest flow of blood. The head should be elevated, and persevering affusions of cold water thrown on it from some height. The scalp should be shaved; cups or leeches may be applied to the skull and behind the ears; but our best reliance is on the lancet and cold affusion, which I prefer to pounded ice or any continuous application. The most active purgative doses should be given—a combination of the resinous and saline, I think, should be preferred, and used freely, as long as the strength will bear. A more permanent reduction of the force of vascular determination to the head may be kept up by proper doses of antimonials, with the nitrate of potass. A cautious employment of opiates may also be found beneficial.

In the meanwhile, the chamber should be kept cool and dark, and the most absolute silence enjoined. The head of the patient should be elevated, and abundant cold drinks allowed him. He must be perfectly controlled, and by such means as admit of no struggle or resistance.

The convalescence must be for some time guarded most carefully. The diet should be low, the mind kept free from care and anxiety, laxatives administered occasionally, and a total abandonment of such habits as may have predisposed to or excited the attack, strictly enjoined.

Chronic Phrenitis—chiefly shown in the varied disturbances of the intellectual functions, known under the name of *insanity*. It is important to draw correct distinctions here, and separate from insanity proper, which I regard as uniformly depending upon cerebral inflammation, the numerous modes of mental aberration arising sympathetically in the progress of many forms of disease, as transient and incidental conditions, and implying none of the circumstances of phrenitis.

The irregular and undefinable states of intellection resembling insanity, are not easily distinguished from each other, but must not be confounded—dreaming, reverie, absence of mind, somnambulism, exalted passion, enthusiasm, intoxication modified by the agents which produce it, delirium, melancholy, fatuity, idiocy, and senile imbecility. It is impossible to define *insanity*—difficult by any form of words to describe it, so as to separate it from either of the above conditions; and yet there is little danger of mistaking them. In fevers, we have delirium; in hysteria, there is fatuity and imbecility; in intoxication there may be every variety of mental disorder, disturbance, and confusion; yet these are not insanity, properly so called. Neither is the amentia or the amnesia attendant on epilepsy, apoplexy, and paralysis.

Causes of chronic phrenitis, divided into the moral and physical—the predisposing and exciting. Of *physical causes* the predisposing are, 1. Hereditary transmission of constitutional peculiarities. 2. Intemperance or excess of any kind. The exciting are, 1. The causes formerly enumerated of acute phrenitis, or acute phrenitis itself imperfectly cured. 2. Gastric and intestinal disorders which, through the close and universal sympathies affecting the brain, act upon that delicate organ. 3. Genital, or sexual irritations which derange in peculiar and inexplicable modes, the various portions of the cerebral tissue. 4. Metastasis of various morbid affections, as on the sudden disappearance of cutaneous eruptions, of gout, &c.

Of *moral causes*, the principal predisposing is found in education, including within that comprehensive term all that conduces to the formation of the character and habits. The imitation of parental peculiarities, eccentricities, and oddities, may thus be enhanced in the child into a forcible predisposition to some mode of insanity.

The exciting moral causes are obvious. The frequent and violent indulgence of passion, the fostering of particular trains of thought and emotion, whether pleasant or painful, irritate and inflame the organ of thought. Very sudden and great changes of condition, as from wealth to poverty, or *vice versa*, produce similar effects.

Pathology.—Bayle refers insanity to inflammation of the meninges; but Foville says that, "as the traces of inflammation are more constant in the brain than in its membranes, we must regard the former as the essential—the latter as the incidental condition.

Necroscopy, indeed, reveals to us a great diversity of morbid alterations. The membranes are thickened, injected, adherent both on their opposite surfaces and to the cerebral substance. This substance is injected, thickened—"occasionally," says Foville, "intensely red. The surface, or superficial stratum of the cortical substance is firmer and denser than natural." Gall and Desmoulins have observed what they call "atrophy of the convolutions—more frequent in the frontal regions; sometimes an actual absorption, leaving chasms filled by serosity. Esquirol has described the presence of a multitude of small cavities in the brain, "from the size of a millet-seed to that of a nut, containing fluid." Couerbe has shown that there is an undue proportion of phosphorus in the brain of the insane.

Diagnosis.—Insanity as the sign, token, or consequence of chronic phrenitis, does not necessarily imply the loss or impairment of any of the intellectual powers; for the brain is a double organ, and it is rare that any of the corresponding parts on both sides shall be diseased. It consists in and depends upon the loss of the power of precise association, through which the mental operations are conducted to definite and calculable results—this inconsistency, irrelevancy or *disassociation*, whether merely speculative or practical—this uncertainty of relation and succession in the intellectual habits, is the only uniform and essential symptom of insanity.

Mental derangement, as the effect or manifestation of chronic inflammation of the brain, may be divided into the following varieties: 1. Incoherence. Some of the cases under this head exhibit a ceaseless activity of mind, marked by the absence of all the principles and powers of regulation. Even the instincts and natural propensities seem often subverted, and the patient is forgetful or ignorant of the meaning of words and of the connection between thought and action. 2. Mania, which has often been called moral insanity. Here the destructive and mischievous propensities are highly excited, and there is great cunning and contrivance in adapting means to ends. Among these were the demoniacs—the possessed of ancient times. Here also the subjects of erotomania and the desperately profane and blasphemous are generally to be classed. 3. Melancholy. 4. Hallucination, the form of insanity bordering most closely on delirium. Some of these hallucinations have been incorrectly, I think, attributed to false impressions made upon the senses. 5. Monomania—a perversion of the judgment on one subject or one set of subjects, and consequent perverted course of conduct or behavior in relation to them. This is often complicated with the former. Insanity as to a single subject is much dwelt on in medical jurisprudence. I believe it to be a very rare condition, if indeed it ever exist.

With the disorders of intellect, there are always combined the obvious marks of physical disease. We find headache complained of by a great many—morbid vigilance, with restlessness. In many, the senses are morbidly acute. In a great majority, they receive almost no impressions but such as are unpleasant and annoying. Convulsions, paralysis, apoplexy, not unfrequently supervene in the progress of cases of chronic phrenitis. The tongue is foul and the breath fetid in most instances; sometimes a viscid, offensive saliva is excreted in great quantity. There is depravation of appetite and great costiveness. The pulse is generally quick, frequent and tense; in some melancholics it is slow. There is much inattention to changes of temperature, but the hands and feet are apt to be cold. An unpleasant odor often exhales from the entire surface of the body.

The *prognosis* is unfavorable. The tables published in regard to the proportion of cures in different lunatic asylums are somewhat apt to mislead. Proper distinctions are not made between the infinitely diversified conditions of mental aberration resulting from various causes. Hysteric folly, delirium tremens, somnambulism, puerperal mania, etc., are easily and in very large proportions curable, and these are confounded with true insanity or chronic phrenitis.

In our *treatment* we must be guided by the state of the general system. If entonic we must bleed from the arm, and by leeches and cups from the head and neighboring parts. Venesection is, however, much less frequently and energetically employed now than formerly, and is not often, perhaps, requisite or beneficial. Purgatives are also useful here; they should not be urged at any time into hasty operation, but a revulsive influence should be long exerted on the intestines. The nauseating and depressing effect of antimonials may be made of much service if perseveringly kept up. Mercurials are sometimes applicable. I do not depend on them in general, but they may be experimented with. They are best adapted to cases which exhibit notable disturbance of the digestive system.

The importance of sleep both as preventive and curative of insanity cannot be overrated. Opium is called for by restlessness with pervigilium, the patient suffering much from want of tranquil and refreshing sleep. In such cases, and in those who exhibit in the waking state peculiar agitation, irritability and other marks of general distress, I do not hesitate to administer anodynes freely, premising such precautions as may seem requisite—employing the necessary means of depletion and revulsion, and keeping the bowels properly open.

Digitalis has been often found of advantage. Cold applications to the head are sometimes required. I prefer the occasional affusion of water from a height on the head to the constant application of cold in any way, as it is apt to annoy and irritate the subject.

I advise almost always the removal of the patient, when the insanity threatens to become permanent, to some well-managed asylum. In such institutions only, can we find and avail ourselves of the requisite means of physical restraint and moral control, not only necessary to prevent him from injuring himself and others, but positively, and in a very high degree salutary in their influence, and remedial in their ultimate effects.

In atonic cases we must be very careful to support the strength of the patient. He must be warmly clad, supplied with nutritious and agreeable food, and occasionally, though with great caution, indulged *pro re nata* in the use of diffusible stimulants. Of these ammonia, camphor, and opium are to be preferred. Tonics are sometimes serviceable, and I have derived advantage from the exhibition of the sulph. quinine, with camphor in moderate doses, or small quantities of some of the salts of morphine.

MANIA-A-POTU.

Delirium Tremens ; Brain Fever of Drunkards ; La Folie des Ivrognes, etc.

Among the numerous appellations of this remarkable disease, I prefer to retain the first of those set down, as strikingly significant of the cause to which it is attributed. Until we have clearly designated its true pathology, we shall not be able to give it a title absolutely correct and entirely objectionable. It is not properly a fever. The line between delirium and mania is not distinctly drawn, and there can be no special impropriety in using the phrase where there is so much mental derangement with constant hallucination. Besides this, it runs so readily into phrenitis, acute and chronic, as to give good ground for this selection. Indeed, although I confess its *pathology* to be very obscure and ill-defined, yet I am rather disposed to regard it as a peculiar form of phrenitis modified, 1st. By the causes which produce it; and 2d. By the morbid condition of other organs with which it is universally connected.

The *cause* to which it is exclusively ascribed, is intemperance in the use of ardent spirits—distilled alcoholic liquors. The influence of these agents is slowly developed in the production of mania-a-potu, which requires time, and which ultimately shows itself in various forms, according to the several diseases of other organs which may exist in each case. Some have maintained the necessity of a transient discontinuance of the use of ardent spirit, and a consequent exhaustion or prostration of nervous energy from the subtraction of accustomed stimuli. The fact, however, is not so. I have repeatedly seen attacks of the several modifications of mania-a-potu, supervening during the actual progress of a "*frolic*," or while the sot was living in his usual manner.

Symptoms.—In a majority of cases the stomach has yielded long previously to the morbid effects of stimulating potations, and the liver and all the other chylopoietic viscera have suffered. There is total loss of appetite, with occasional retching and vomiting, especially in the morning; the bowels are irregular, usually loose, with acrid bilious discharges; the hand and tongue are tremulous; the latter thickly furred, with fetid breath, or smooth and fiery red. The mind is deeply depressed, and the state of intoxication into which the patient plunges for relief from this dejection, is often more gloomy and remorseful. At last, the patient wanders; he mutters incoherently, and with incessant restlessness; or if he sinks exhausted into a brief and unquiet slumber, starts from it in terror which cannot be soothed. The pulse is weak and very frequent, his skin cool and clammy, his eye red and suffused. Convulsions may occur, but are not usually met with when the stomach is still disturbed with the frequent retching, so prominent a symptom of this form of the malady.

In some patients the brain suffers more immediately, and with much less gastric disturbance previously, or at the time. Some fit of intoxication, deeper and more prolonged than ordinary, terminates in a horrid convulsion, followed by another and another. The unhappy subject may thus die at once; or he sinks into a state of exhaustion, with cold skin, pulse indescribably rapid, and so feeble as to be scarcely felt, with countenance haggard and eyes half shut. After lying thus for some time, his muscular strength suddenly returns, and he becomes capable of prodigious exertions; he is haunted by some frightful hallucination, and becomes extremely dangerous to those about him, whom, in his frenzied anxiety to escape, he will assault and pursue with vehement malignity. This condition may run into acute phrenitis, and sometimes terminates in permanent insanity.

Others, again, with less obvious affection of the digestive system, and no acute cerebral disorder, sink into absolute imbecility, both mental and physical, mingled with a peculiar shade of gloom and despondency. The skin, in such cases, is hot and dry; the pulse is small, corded and frequent; the patient takes almost no food, and scarcely sleeps; seems always restless and uneasy; he affects solitude, often mutters to himself, and appears *alarmed causelessly.* In almost all there is a notable predisposition to suicide.

The *autopsy* of mania-a-potu develops nothing uniform or characteristic. A variety of lesions have been noted, but none are regular. The "anatomy of drunkenness" shows marks of extensive disease of the stomach, the liver, and the brain; the progress of the several changes or steps of disorganization is proportioned to the duration of sottish habits. But all these changes may have taken place without the production of this particular form of disease.

Solly, who classes delirium tremens among "anæmic affections of the brain," confesses that "our pathological records of it are very scanty," but declares that he has "invariably found the hemispherical ganglion, the cortical substance, pale and bloodless; the venous canals were generally full, and occasionally the arachnoid thickened, as if it had been the subject of chronic inflammation." This venous congestion has been observed by Armstrong also. Copland and Blake mention serous effusion, which the latter declares he saw in all his examinations.

The *diagnosis* is important to be drawn; yet it is not always easy. The physiognomy is somewhat characteristic, always, I think, expressive of uneasiness or fear; the muscles are tremulous, though the step may be firm, distinguishing the case from ordinary intoxication, which is vertiginous and unsteady rather than tremulous; the tongue trembles in mania-a-potu; the pulse is usually weak, as well as exceedingly frequent.

The delirium is well described by Watson as "a busy, not a fierce or mischievous, delirium." There is an unnatural quickness and bustle of manner. The history of the attack must be inquired into, and the habits of the subject. Whatever be the nature of the lesions, one thing is certain, viz: that they are the direct and positive results of alcoholic poisoning; and where the excessive use of the poison is ascertained, we have no longer room for doubt.

The *prognosis* is generally favorable. Few die in mania-a-potu, and those few rather of the derangements of the constitution, which are the coincident effects of the cause which has produced the attack. The tokens of a specially unfavorable case are, obstinate pervigilium, which always threatens convulsions—a repetition of the convulsions, with brief interval—or the occurrence of coma. It is also unfavorable to find the pulse rising and becoming fuller and slower, while the mind continues disturbed. We have here to dread permanent insanity.

The *treatment* must be modified to suit the condition of the patient. Venesection is seldom necessary or justifiable. It may be required to obtain a respite from convulsions. When a *transitus* has taken place to the condition of acute phrenitis, the lancet should be freely employed; this is marked by fulness, and hardness, and comparative slowness of pulse; by the cessation of trembling of the limbs and tongue, and by a change in the manner of the patient, who is now fierce and resolute, and no longer full of tremor and vacillation. If there be no doubt on this point, the hair must be cut close, and leeches and cups applied to the temples and back of the neck. But such cases, it should be kept in mind, are not common, and this mode of depletion is not often to be resorted to. Cold affusion may be of advantage when the face is flushed, and the skin is hot and dry; under opposite circumstances, I would not advise it. Emetics have been highly eulogized, but they are of doubtful effect. When the stomach is nauseated with ineffectual vomiting and retching, with foul tongue and fetid breath, they may do service. They may also be occasionally employed to rouse the susceptibility to other remedies, when we have found ordinary doses incapable of affecting the patient. Cathartics are often beneficial. Calomel, in large doses, is the best. The saline may be added if the patient be strong and robust. In general, however, it is not advisable to employ cathartics freely. Opium is unquestionably our most important remedy. It is applicable to all cases of mania-a-potu, and has only been subjected to doubt by having been erroneously prescribed, when the case has run into phrenitis of ordinary character. I prefer the tincture, and prescribe it with unyielding perseverance, until the patient sleeps. I do not like to combine it with any other stimulant. Camphor and ether are the least objectionable, if an addition be necessary. Nor can I assent to the propriety of exhibiting large quantities of solid opium, which may not dissolve at all when most needed, and may lie inactive in the stomach, until a period when its solution, and consequent absorption and active influence, may be productive rather of injury than of benefit. I once found in the stomach of a patient, whose body I examined, at the request of a friend, who had been in attendance, many grains of opium undissolved. I offer a teaspoonful of laudanum every hour, in ordinary cases, until sleep is induced. On one occasion, the dose was repeated fourteen times; then there was a sweet and long sleep, followed by recovery.

Those who regard mania-a-potu as always resulting from a deficiency, or want of the accustomed stimulus, especially if, with Solly, they consider the brain as suffering under an anemic condition, consistently employ stimulants, and resort to those which the patient was in the habit of using. Porter and gin, brandy and wine are given freely; but, says Solly, "I always combine with them opium and ammonia." Even when the "delirium ebriosorum," as he styles it, is complicated with "the pathological condition of inflammatory action of a low character," he says, "it is necessary to support the system with the accustomed liquors, and employ local counter-irritants to the head, with diuretics, to prevent serous effusion."

If the stomach is too irritable to retain what is swallowed, we may administer our remedies as enemata.

Digitalis is proposed as a substitute for opium, and the tincture is administered in large doses, from one to three drachms every four or six hours. Thus exhibited, I have seen it unquestionably useful. Chloroform and other anæsthetics have lately been resorted to, and, as has been stated, with the most obvious benefit, the patient being rendered soporose and tranquil by their inhalation.

The management of the patient is a matter of the utmost importance. He should be kept under absolute control by a sufficient number of trusty attendants, or, which is often better, by solitary confinement, with constant supervision.

His diet, if he take any, may be nutritious and well seasoned. His convalescence should be carefully guarded. His mind must not be disturbed by care or business. Tonics may be of use to him, but all stimulating beverages of alcoholic character must be postively refused.

The *prophylaxis* of mania-a-potu, the reformation of the drunkard, is a topic of infinite interest. The peculiar craving or longing after ardent spirits is, in the sot, the consequence of morbid condition of the stomach chiefly. To remedy this, it is proposed to combine sulphuric acid with his accustomed drinks, and the effect, in some cases at least, is said to be strikingly advantageous. By others, it is suggested to mingle with his favorite forms of distilled liquors, the tart. antimon. or ipecac., or other emetic, in such amount as to nauseate long, and vomit severely. These attempts may sometimes succeed, but in general they fail, or produce only a transient influence. Nothing is to be hoped from any measure short of perfect abstinence; nor is anything to be feared from the abrupt enforcement of the injunction. I would scarcely allow in any case the use of a substituted stimulant; but if such an indulgence seemed necessary in a given instance, opium and camphor would suffice abundantly, and, the dose being rapidly diminished, might soon be withheld.

APOPLEXY.

Apoplexy may be defined to consist in a loss or remarkable impairment of the power of motion, with insensibility and stupor. The patient cannot be roused, and gives little or no token of consciousness. The action of the heart is little disturbed at first, but soon becomes slower, then quicker and feeble, and after a time ceases. Respiration is performed with some labor and difficulty, and with stertor generally, the difficulty increasing as the circulation is more impeded.

Causes.—A predisposition to apoplexy is found in a full plethoric condition of body, habits of undue indulgence in the pleasures of the table and venereal gratifications—in mental excitability, liability to gusts of anger, and other violent emotions. Yet it is not the luxurious only, who are thus predisposed; similar tendencies are often found in the ill-fated, badly nourished poor. As age advances, the predisposition seems to increase. It is commonly believed to be connected with a particular form, of which "rotundity, corpulence, with thickness and shortness of neck," is the description.

The exciting causes which affect the predisposed are numerous; all stimulants, a full meal, especially if the subject place himself soon after in the recumbent posture; insolation, vehement muscular exertion, ligatures round the neck, fits of passion, stooping down for any length of time—all circumstances, in short, which either render active the cerebral circulation, determining to the brain, as the phrase is, or which impede the return of blood from the head. Apoplexy is said to be often connected with hypertrophy of the heart, and to follow the sudden disappearance of regular gout, or the suppression of accustomed evacuations.

Diagnosis.—Apoplexy resembles profound sleep, but the sleeper may be aroused; it is distinguished from syncope in doubtful cases, by the respiration which is almost always noisy and laborious—generally, also, by the pulse, which is full and slow, and the countenance, which is, in a majority of instances, flushed; from epilepsy, by the absence of contortions or convulsions; from asphyxia, by the previous history of the case, and in the same manner from the torpor of extreme cold, which closely resembles it. It is difficult to distinguish it from deep intoxication, and it is often most perfectly simulated by the hysteric paroxysm. There is also a sympathetic loss of sense and motion from gastric disorder, not easily separated from it, but for the most part transient and readily relieved.

The *prognosis* is generally unfavorable—perfect recovery from it is not frequent; hemiplegia is a very common result of the attack; there is a strong tendency to recurrence. The best hope of restoration is in the young and temperate, subjects marked by no especial bad habit or other token of predisposition, and attacked under circumstances of transient influence, as from insolation. In the old and infirm, and intemperate, the prospect is gloomy.

When one side is in any degree agitated, and the other remains motionless, we predict paralysis of the latter. If the pulse sink, the respiration becomes louder, with puffing of the cheeks, and relaxation of the sphincters occur, we expect a promptly fatal termination.

Autopsy.—The appearances vary somewhat, but, in a vast majority of cases, betoken impediment to the performance of the functions of the brain, or actual lesion of cerebral structure. Hemorrhage is of frequent occurrence. Blood may be poured out upon the surface of the membranes, or within the ventricles, or in the very substance of the brain, with laceration. Serum or sero-purulent fluid may be found in the ventricles or upon the membranes. Turgescence of the cerebral vessels is rarely wanting in greater or less degree. Exceptions are, however, recorded on good authority, in which none of the above marks of disease within the head were discovered.

Pathology.—Apoplexy is properly the abolition or suspension of the sensorial functions, occasioned by pressure on the brain. Mechanical pressure, as by fracture and depression of the skull, gives rise to a train of symptoms precisely the same. This pressure may be—1. Extravascular, *i. e.* from fluids poured out, blood, serum, pus; or it may be—2. Intravascular, from mere fulness or turgid state of the cerebral vessels; which latter may disappear at the time of death, leaving no trace.

Treatment.—This must vary with the condition and circumstances of the patient, which in different cases will be strongly contrasted. Apoplexy has, in relation to these diversities, been divided into two forms, sanguineous and serous, meningeal and cerebral, entonic and atonic—phrases significant, and applied with some foundation in propriety. These modifications are explained by the constitutional peculiarities of the subject, by the nature of the cause which has affected him, by the degree of lesion of the brain, and the particular locality of the lesion.

1. A majority of cases present the following symptoms: The pulse is full and strong, though slower than natural; the face is flushed or turgid, the eyes prominent, the pupils somewhat dilated, though not altogether insensible to the influence of light, the respiration stertorous, the surface is of natural temperature, the features flabby, and the jaw somewhat fallen. There have been, for the most part, certain premonitory symptoms before the fit, such as flashing of light before the eyes, tinnitus and other noises within the ears, fulness or throbbing, or pain in the head and vertigo with somnolency; and sometimes a failure in strength of the arm and leg on one side, or a sense of numbness in them or in the tongue, for paralysis may precede as well as follow apoplexy.

In this state of things, the lancet should be promptly employed, and fearlessly, and blood drawn from a large vein or veins to an amount sufficient to make a definite impression upon the force of circulation. Apply cold affusions on the head, the hair being cut close or shaved. Active cathartics and enemata must be used for their revulsive effect; the drastics will be chosen on account of the impaired susceptibility. When the patient cannot swallow, croton oil may be laid upon the tongue. Emetics are doubtful remedies, and should not be employed, unless when the patient is attacked soon after a full meal. Sinapisms at first, and epispastics later, will be of probable service. The best means of promoting the ultimate recovery of the patient, and to confirm a cure once begun, is to keep up a regular and free determination to the bowels, by the use of efficient purgatives in repeated doses.

2. The patient is sometimes pale or livid, with a cold moist skin, and a pulse feeble and intermittent. This class of cases cannot readily be distinguished, especially when produced by *insolation*, from the syncopic exhaustion and pulmonary congestion described by writers on the various conditions included under the general head of "sun-stroke." Here the lancet is forbidden. Cold water must be applied over the head by affusion, or with a sponge, and cups to the back of the neck and between the shoulders, or leeches behind the ears or around the anus. Volatiles should be held occasionally to the nostrils, and mustard laid upon the extremities and the epigastrium. Stimulating enemata should be given without delay, and the epispastics laid upon other parts of the surface. If the pulse rise under this treatment, we may administer purgatives cautiously, and keep up determination to the skin and kidneys by diaphoretics and diuretics. Of the former, the antimonials are preferred by some. The nitrate or acetate of potass will act serviceably upon the kidneys.

To prevent the recurrence of so terrible a malady will require much care and skill on the part of the physician, and much resolution and self-control in the subject. He must live regularly; take free and rough exercise in the open air; deny himself all indulgence of appetite, and restrain every passion or emotion. He must engage in no intellectual exertion. He must retire early to bed, and rise promptly on waking in the morning. His food must be of the plainest character, nourishing but unstimulating; and he must abstain entirely from all fermented and alcoholic beverages.

PARALYSIS—impairment of sensitiveness, and of motive power, and of the control of volition over it, next demands our attention.

Hemiplegia, or palsy of one side of the body, is closely connected with our last subject, as being an affection of the brain, primarily, and always the result of pressure on some part of that organ.

Apoplexy itself, in its worst grade, has been considered a complete and total paralysis; but there are degrees even in apoplectic seizure, and various divisions, forms of partial paralysis. We may have palsy of a single limb, nay, of a single muscle, or of a few muscles. In colica pictonum, there is palsy of one or both hands. The arm has been palsied, while the hand, if supported, was capable of writing. A palsy of one side of the face is not very rare. The tongue is sometimes palsied. In paralysis agitans, there may be a constant trembling of the hand or an incessant shaking of the head. This is common with the aged, but I have met with it also in the young and robust. In apoplexy and hemiplegia, the brain is evidently the seat of injury. The mind is disturbed more or less, and both sensation and motion are impaired.

Ramollissement of any part of the brain is attended with paralysis usually partial, and some mental failure. The "partio-general" paralysis of the insane, so well described by Earle, is of this character.

Paraplegia, which, in the great majority of instances, arises from obvious injury or disease of the spine, has been ascribed in a few to cerebral derangement, and has occurred as a sympathetic effect of gastric or intestinal disorder, without any perceptible change in the condition either of the brain or of the spinal cord. In *chorea sancti viti*, *paralysis vacillans* (styled by some, p. agitans, incorrectly), the tremor or agitation is not constant, but exhibits itself at the moment when an effort is made at voluntary motion. The motion fails in part, and the muscles called upon act with vacillation and irregularity, perhaps feebly. There can be little doubt, I think, that the cerebellum, the organ of association of action, is here affected as well as the nerves, and when the case is severe and protracted, the whole brain may become disordered, the patient grows gradually fatuous, and there is tendency to convulsions.

HEMIPLEGIA, as I have said, is nearly allied to apoplexy, which it may either precede or follow. As the consequence of the apoplectic seizure, it occurs not rarely. Its approach may often be observed and foretold. I have more than once marked in the apoplectic, the exact moment of its occurrence, denoted by a slight quivering of the muscles of the face, trunk, and limbs, which in an instant relax, and subside into a passive condition.

It often invades gradually and independently. The patient first complains of a numbness and tingling of one arm and leg, is apt to trip or stumble, and to let fall what he attempts to hold; there is noise in the ears, and the eye of one side cannot be closely shut; there is some distortion of the mouth, and articulation is impeded. The mind is usually disturbed; the memory generally fails, though not invariably, and some terror attends the feeling of so great a calamity. When fully developed, hemiplegia implies an incapacity to stand or walk, or close or raise the hand or the eye; but the power of sensation and voluntary motion in the side affected, though greatly impaired, is seldom, if ever, totally lost, and in numerous cases the sensibility has remained, or been morbidly enhanced, while motion was impossible, and *vice versa*. In one remarkable instance, there was a loss of power on one side, while the feeling of that side continued, and loss of sensibility on the other, the voluntary movements of which were not impaired. These facts are explained by reference to the independent origin of the two sets of nerves.

Sometimes the case runs rapidly on into apoplexy, occupying from a few hours to a few days, the prostration of muscular power increasing, and the mind becoming more and more disturbed, until insensibility and coma supervene.

Many patients, however, drag out a miserable protracted existence of months and years of unabated suffering. The nutritive action of the vessels of the affected limbs is imperfect; they shrink and are emaciated, their natural heat being lessened; harshness and dryness of the surface ensue, the ordinary transpiration ceasing; the fingers are pale and waxen, and sometimes contracted, the countenance is distorted by the traction of the mouth to the sound side, the saliva escapes over the chin, the tongue is thick, and when protruded, turns to the paralytic side, and the speech is confused and indistinct. There is sometimes severe pain; sometimes spasmodic muscular contractions on the affected side. *Amnesia* is usually present in various degrees. The memory of words is oftener lost than the remembrance of things or facts. The names of familiar objects are sought for in vain, or incorrect names obstinately applied, and words pronounced by the tongue which the will had not contemplated. The emaciation and debility increase, until the patient sinks, worn out and exhausted by a long train of evils, in which every function has successively suffered.

In a few cases a gradual improvement takes place, and a restoration of some of the capacities for action and enjoyment; but such recoveries are rare. They are attended with formication and tingling of the limb, and sometimes painful swelling, while the power of motion increases slowly, and the mind gains strength. According to my own observation, this recovery of motive power scarcely ever takes place to any great extent, except in the lower limb; the paralytic hand is very seldom restored in hemiplegia.

The *causes* of hemiplegia are those of apoplexy, already enumerated —plethora, from luxury and excess among the rich, and the apparently contrasted, though closely analogous condition, arising from imperfect supply of food, in the poor; insolation and intemperance in drinking.

The *prognosis* is unfavorable. We know that absorption of extravasated blood, which, by its presence in the brain, has produced hemiplegia, may take place; but the process is slow and uncertain, and the constitution in the meanwhile sinks under the general impairment of the functions. Laceration and disorganization of the cerebral tissue hardly admit of restoration. Yet recoveries do occur, even after "softening"—ramollissement.

Autopsy.—The most common circumstance noted in the examination of hemiplegics, is the presence of a clot of blood in some part of the brain. It is usually, perhaps always, enveloped in a cyst, and has undergone more or less change from absorption. The process is slow; the clot has been found undiminished in size, and filling the cyst, two years after the attack. Sometimes the cyst is found empty, with its sides collapsed; at others, it contains serum. Tokens of inflammation of a portion of brain are found; there is induration of substance; or *softening* takes place, the nature of which is not well understood. It is often, I think, a vice of nutrition. Bennett and Solly maintain that it is of two kinds, inflammatory and not inflammatory; and that these are distinguishable by the microscope, which, in the former, will always show the presence of exudation-corpuscles. Abscess or effusion of pus, of serum, various morbid growths, tumors and tubercular deposits, have been seen within the brain, or connected with the membranes.

The *pathology* of hemiplegia is readily deducible from what has been stated above. It is the result of pressure upon some part of the brain; and the degree and kind of effect are in relation to the locality and

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longata, laterally and from before backwards, but also prevails in the cerebellum, the pons, and the peduncles. The upper extremities are more frequently paralyzed than the lower; and when the two are affected, the former suffers most. In the event of a favorable issue, the paralysis is more persistent in the arm than in the leg."

"The attempt," he goes on to inform us, "has often been made to discover detached foci of innervation in the brain, but it has invariably failed." Yet we are perpetually tempted to inquire into the connection between local or partial paralysis, and the conditions of the cerebral or inter-cranial substance with which they may be connected. Of these, the most noticed are the paralysis of the muscles of one side of the face, and the digitus semi-mortuus of Marshall Hall—both of them important, as indicative of cerebral congestion and impending apoplexy. But we have not found any constant lesion associated with them.

Next we treat of affections of the Spinal Cord.

PARAPLEGIA, the *spinal paralysis* of Romberg, is one of the most hopeless of human maladies. The muscles of the lower extremities and of the pelvis are paralyzed, usually relaxed, sometimes, though rarely, contracted. It is curious to observe that although we ascribe the affection to exclusive spinal derangement, yet that "conscious sensation" is generally impaired. Cases have occurred in which the limbs, however, have retained their sensibility intact. In some instances, micturition and defecation have continued under the control of the patient; in many, the bladder has lost its contractility, and the sphincters are relaxed. Marshall Hall has drawn our attention to the fact that the irritability or spinal sensibility, and the reflex action, are exalted in the paralyzed limbs; in some they twitch convulsively and spontaneously; in all, or almost all, twitching and convulsive movement are readily excited by any modes of irritation. Paraplegia may, of course, exist in various degrees—from a mere dragging and numbness of one or both limbs, to the total incapacity of voluntary motion or voluntary restraint just described.

Pathology.—It is possible, perhaps, that paraplegia may arise from *cerebral* lesion or disorder; but it must be extremely rare. "It consists in the loss of motor conduction in the fibres of the anterior columns of the spinal cord, which are given off at and below the point of injury" or disease. The posterior columns are usually more or less implicated, as I have said, and sensation in corresponding degree impaired. There is always, too, some impairment of the nutritive functions in the parts, which suffer more or less atrophy, and sometimes, indeed, become gangrenous.

Autopsy usually exhibits some spinal lesion. Caries of the vertebral column, inflammation and hemorrhage of the cord, induration, atrophy, softening, are all occasionally found. A gray degeneration of substance is described, and tubercular tumor and deposit. But there are instances in which no palpable change in the condition of the medulla spinalis has taken place. I was consulted in one such, a dyspeptic subject, who for many years before his death was entirely paraplegic. Examination post mortem showed both renal and intestinal change; but the spinal marrow seemed perfectly normal.

The *causes* of spinal paralysis are not always clear. I have seen it follow a tedious attack of typhoid fever. Sensual excesses have produced it. Falls and blows on the spine, not immediately impressive, are accused of giving rise to a progressive myelitis or meningitis, which results in this terrible disease.

Treatment.—If there be tenderness at any part of the spine, leeches or cups should be repeatedly applied to relieve it. The bowels are apt to be constipated, and require the employment of laxatives. The condition of the bladder must be inquired into, and the urine drawn off as often as necessary. The paralysis of the bladder is one of the most tormenting of the annoyances of advanced life. Day recommends the use of ergot in free doses—ʒj of the strong tincture ter die in an effervescing draught of citrate of ammonia. Gerard, of the Hôtel Dieu, Marseilles, eulogizes it as curative in paraplegia, even of long standing. He recites three cases successfully treated with it, one of which had been paraplegic four years. He gave ergot, gr. x per diem, gradually increasing the dose to gr. xl. They were restored within two and three months. Iodine and its combinations have been confided in by some; strychnine by others. Electricity, galvanism, and electro-magnetism, in various modes applied, are said to have been serviceable. I am disposed, however, to conclude, with Romberg, that "all attempts at a cure directed against an assumed morbid state of the spinal cord, whether exudation or inflammation, and the application of leeches, issues, nux vomica, electricity, etc., are apt to prove fruitless," unless we assiduously apply also "those remedies which tend to encourage nutrition," and bring the system of the patient up to the highest attainable point of tone and vigor.

CHOREA.—*Paralysis Vacillans.*—This strange malady has many names, and has been arranged under both heads of convulsion and palsy. From certain fanciful associations, it is known as St. Vitus's dance, the dance of St. Guy, and has been confounded, improperly, with the tarantula of Italy and the hysterical affections of fanatic enthusiasm, which, however, have occasionally given rise to it.

Chorea does not by any means consist in a simple loss of power in the muscles affected; but essentially depends upon the impairment of the control of volition over the voluntary motions. It is sometimes unilateral, but usually general, nay universal, the whole voluntary motive system being disordered; though the affection of one portion may be more prominent than that of others.

The obvious *diagnostic* of true chorea, is this: that in all cases at first, and in a majority throughout, the cause of involuntary or irregular contraction of the muscles acts upon them only at the moment when the will is directed upon them, and when they dispose themselves to respond to volition, leaving them at other times tranquil. In the most violent cases that I have ever seen, I have always been able to succeed, in greater or less degree, by soothing language and gentle repression, in restoring comparative tranquillity to the patient, agitated by a most painful consciousness of his condition, and ever anxious and still hopeful to regain the lost control over his movements. These movements are singularly awkward; nay, the books shamefully describe them as "ludicrous." Though sometimes violent, they are never painful, though they may hurt the patient, by collision against adjacent objects. Copeland says it is "more frequently partial than general;" but I have never seen a partial case. The movements cease during sleep; but the rest of the patient is apt to be easily disturbed. In all cases that I have met with, there has been obviously a coincident impairment of the general health. The appetite is defective, the breath is fetid, the bowels irregular; as the attack goes on, the patient is more and more restless, desponding, anxious, and agitated; sheds tears often and profusely; walks insecurely or cannot move about at all; in the worst examples, requires to be restrained from injuries inflicted on the head, hands, and feet, by violent concussions; deglutition is difficult and uncertain, mastication impossible, and the articulation indistinct. The eyes are red, and wild looking; the temper pettish and irritable; the mind unsettled and imbecile.

Chorea is happily so seldom fatal, that little light has been shed on its pathology by *autopsies.* I am, however, convinced that the whole sensorial system, inclusive of the brain, labors under some morbid condition, the nature of which is by no means inflammatory, as some have supposed. This sensorial disorder may be, in some cases, primary, but in general seems to be secondary and sympathetic, resulting from gastric or intestinal derangement, in the greater number. The disease occurs almost exclusively in childhood; exceptions, it is true, are recorded, and I myself have seen one, but we rarely meet with it in an adult. Girls are oftener attacked than boys, as being, from original constitution, and education also, more mobile and susceptible. It leaves behind, as some affirm, a strong tendency to recurrence. I am farther convinced that it scarcely ever fails to produce a most unfortunate influence upon the youthful intellect, with whose development it sadly interferes. Convalescence from it is seldom, if ever, free from notable imbecility, amounting, occasionally, to absolute fatuity; from which the patient recovers very slowly.

A considerable number of authorities have fixed upon the brain, indeed, as the seat of the disease, but they differ as to the portion of the cerebral mass which is morbidly affected. Copeland found, in addition, inflammatory appearance of the spinal cord, but with proper caution, refuses to refer chorea to that condition as its cause. Serres detected morbid changes in the corpora quadrigemina in four cases, and with less reserve, considers these bodies as the seat of chorea. Others, still, from physiological analogies, refer it to the cerebellum.

The *causes* of chorea are uncertain. I saw it, in one case, supervene during recovery from scarlatina, and in another, it came on while the child was convalescent from a severe attack of catarrhal fever. It seems to have resulted, occasionally, from verminous irritation. I recollect an instance in which it appeared to depend upon the presence of a needle in the body, which had been swallowed, and, many months after, found its way out of the buttock, the child laboring throughout all this time under chorea. Mental emotion, and especially sudden fright has given rise to it very frequently. Rufz attributes to this source, 11 out of 18 cases under his notice.

Bright speaks of rheumatic affections, both articular rheumatism and rheumatic pericarditis, as frequent complications and causes of chorea. This connection is denied by Romberg. M. Sée, however, whose essay on the subject gained the prize from the French Academy, affirms it strongly, and maintains, 1. "That chorea is generally the result of the rheumatic diathesis, and manifests itself by plastic inflammation of the cardiac membranes, the pleura, and the peritoneum. 2. In some ill-defined circumstances, the choreic phenomena are accompanied by an arachnoidal effusion, or a disorganization of the nervous substance. 3. There are cases essentially nervous affections—neuroses—independent of any appreciable change in the economy." He tells us that "thirty-four necropsies showed pseudo-membranous or purulent inflammation of the serous membranes, especially the pericardium and arachnoid; in 17 of these rheumatism existed; 22 showed alteration of nervous substance, or meningeal hyper-secretion; 16 afforded only negative results."

Romberg, who seems to consider the cerebral symptoms, which he says "often supervene," as mere complications, "such as excitement, delirium, and mental obtuseness," nevertheless found, in two of the three post-mortem examinations he made, decided proof of cerebral disease; in the first, "the cerebrum was atrophied, with softening and serous effusion; the spinal cord not visibly altered; in the second, there was hypertrophy, with softening and effusion; in the third, the brain was healthy, the upper part of the cord slightly softened."

The general *prognosis* is favorable. I have seen no death, and but twice a return of the disease; and such is the testimony of several writers. Brown, however, saw three fatal cases; Copeland three or four; Prichard four; Romberg three.

The *treatment* must depend upon the apparent or supposed cause of the attack. Hamilton, attributing it uniformly to derangement of the primæ viæ, as the primary and prominent condition, recommends, in the strongest terms, the persevering employment of mild purgatives. And, indeed, whatever may be said of the theory, his practice has been eminently successful. Cathartics are always indicated, in the first instance, by the foul tongue and fetid breath, and if they do no other service, they tend to relieve the obvious determination to the head, which annoys the patient.

There are often reasons to suspect the presence and irritation of worms, when some anthelmintic remedies, judiciously selected, should be added to our purgative formulæ. After a certain period, it becomes necessary to combine some tonic also, and of these, I decidedly prefer the carb. ferri; sulph. zinc. is highly eulogized, and may be exhibited in very large doses. Elliotson says that, beginning with a grain, you may increase to six, seven, or eight grains, which children will bear (after meals), three or four times a day, without nausea. He goes on to tell us that he has given to adults as much as twenty to twenty-five grains, three times a day. Arsenic and quinine have also been used with advantage. The latter has been prescribed in very large doses, and is urged upon our attention with strong expressions of confidence; but, for my own part, I select and depend upon the mineral rather than the vegetable tonics.

The cimicifuga racemosa, or black snakeroot, is much used in the middle and northern States, having been brought into vogue, I think, by Dr. Physick. The cold bath has been resorted to. I have found it beneficial in one instance; but the shock is more than can be well borne by most patients. Cold should, however, be most assiduously applied to the head, from time to time. The lancet does not seem to me to be at all adapted to the disease, as I have met with it. So, also, I pronounce as to the irritative revellents recommended by some authors, blisters, setons, issues, moxas, and the like.

Narcotics and sedatives are occasionally beneficial. I have derived advantage from very minute doses of opium, with alkali, as in the "diaphoretic mixture." A weak aromatic infusion of camphor may also be of service: belladonna, stramonium, digitalis, and prussic acid, have been eulogized, as also musk, electricity, and galvanism.

The cases which, in the course of my practice, I have met with, have without exception, yielded to the treatment that I have above indicated, as deserving a preference. The children have been kept secluded, under the care of a quiet nurse, upon whom the injunction was strongly laid, to endeavor, constantly, by every gentle influence, to repress all emotion or agitation, bodily or mental. The head, in bad cases, has been kept cold by wet towels applied from time to time, the hair being cut closely. The bowels have been constantly acted on, but never violently or painfully; at first, by rhubarb and calomel, afterwards leaving out the mercurial, and combining the carb. ferri. This course has been patiently persevered in. If the bowels become soluble, or too loose, the cathartic was abandoned, and the diaphoretic mixture substituted, a few drops of Fowleri min. solut. being added to it. If necessary, means of restraint were used to prevent injury to the hands, feet, and head of the patient. The food consisted of light, farinaceous articles, in fluid form, with milk and eggs. Every imaginable indulgence was bestowed on the patient, if not absolutely injurious, and every wish complied with; care being taken to avoid excitement, and, as far as possible, to prevent depression and dejection.

The empirical management of chorea has been greatly varied, and some of the results have been as curious and interesting as they are difficult to explain.

Sulphurous baths, so highly recommended by Baudelocque, have been wonderfully successful. They are prepared in the Paris hospitals for children, by adding four ounces of the sulphuret of potash, to sixteen pails (?) of water. The average duration of treatment was 24 days. Out of one hundred and thirty-five cases thus treated, only eighteen were not cured.

M. Blache treats chorea Sancti Viti by gymnastic exercises. He admits two indications: 1. To restore to the will its lost control of the muscles; and 2. To change the constitution of the patient. Of these the first is his chief object. Of one hundred and eight cases, subjected to this course at the Hôpital des Enfans, all were successfully managed but six. Some chronic cases "yielded only in one hundred and twenty days, and seventy-three exercises." Under passive exercise, we are told, the muscles become calm, the appetite is improved, the circulation invigorated, muscular power increased, and the complexion becomes florid. The combination of these two plans seems productive of the best results.

Professor Merei proposes "the ammonio-sulphate of copper, as the sovereign remedy for chorea." His prescription is as follows: ℞.—Aq. menth. pip. oz. iv; syrup simp. oz. ss; ammon. sulph. cupri gr. viij to xij. M. S.—To take a teaspoonful four to six times a day; if the patient be anæmic, a portion of tinct. ferri æth. should be added.

Merei's remedy, it appears, has been long in use in Italy, where it is known as the "specific of Stissen." Dr. Roe, of the Westminster Hospital, reports very favorably of it. The dose which he gives to children mostly under fourteen, was from one-half to three grains daily. (See *Ranking's Abst.*, 1853.)

The truth I suppose to be that chorea is often a transient malady, produced by some transient cause, or dependent upon some temporary contingency. These, whether appreciated or not, being evaded, or passing away, and a reasonable superintendence and proper regimen observed, the malady will, in the very great majority of examples, subside spontaneously, and disappear.

EPILEPSY.

Convulsion has been ranked by Cullen, Good, and other nosologists, as a separate class in the system of each, and made to include several orders or varieties. I cannot find sufficient reason for following them in this arrangement. Convulsion appears to me, in all cases, a mere symptom, varying widely in its combinations, modes of access, extension, etc., relatively to the circumstances of predisposition, and, also, to the specific irritations which give rise to it. It may be defined to consist in a series of involuntary, rapid, and forcible contractions of the muscles of voluntary motion, alternating with transient relaxations of the same; or of alternate contraction of muscles opposed in their action, as of the flexors and extensors. Most commonly, the flexors predominate, both in vehemence and steadiness of contraction, especially in the hands, which are almost universally clenched, the thumb being drawn into the palm. Yet the arms and legs are not unfrequently thrust out or extended, with such abruptness and vehemence, as to overthrow and injure the bystanders and assistants.

These rapidly alternating muscular contractions and relaxations serve clearly to distinguish convulsions from *spasm*, properly so called, which consists in a protracted contraction of muscular fibres, relaxation occurring gradually, if at all. Some of the authorities arrange both convulsion and spasm under one general head of spasm; the convulsive being distinguished as *clonic*, and the rigid or permanent, as *tonic* spasm, or cramp.

Of all the morbid affections which present themselves as part of the inheritance of our frail and afflicted race, *convulsions* are, in appearance, the most horrible and revolting. The violent agitation of the frame, the writhings and twistings of the body, seemingly so expressive of unutterable distress, and the frightful distortions of "the human face divine," form a scene which it is impossible to contemplate without the most profound and heartfelt sorrow. No one can fail to remark the excessive force exerted by the muscles, when contracting under the various irritations which give rise to convulsions; a degree of power extraordinary, indeed, and vastly beyond all that they are capable of when stimulated by the most determined and vehement volition. Feeble women, debilitated invalids, and young infants, draw up and extend their limbs with a violence scarcely to be resisted or controlled by the vigorous efforts of robust men. I am not disposed to agree with Good or Cullen, in affirming stupor or coma to be essentially connected with this particular condition of the nervous system, as a uniform rule. Nay, I doubt whether there is necessarily any disturbance of the intellectual functions. I have seen a very athletic man, while laboring under an attack of what was known formerly as "the Kentucky jerks," a form of convulsion brought on, in great numbers, by religious excitement, directing with great intelligence how he should be held, so that he might suffer no injury, and apologizing humbly for the blows he inflicted upon those who were attempting to aid him. I have repeatedly seen hysteria attended with the most vehement convulsions, while there was present not the slightest "tendency to stupor or lethargy," as Cullen has it; no evidence of "diminished sensibility," to use the phrase of Good.

In the disease now to be treated of, however, both these circumstances are present, as forming elements of characteristic occurrence. In EPILEPSY, the patient falls suddenly, loses all consciousness and sensibility, and is agitated by convulsions, which, after a time, subside, leaving him languid and soporose. The disease becomes habitual or periodical, regularly or irregularly; recurring with a violence greater or less, and after an interval, shorter or longer, in proportion to the intensity of the causes which have originated the attack, and to the mobility and irritability of the system of the patient.

A fit of epilepsy may be conveniently divided into three stages, the premonitory, the convulsive, and the soporose. These are not uniformly present in every paroxysm; but they very generally concur, and in such subjects as are long affected with habitual epilepsy, either of them is rarely wanting. Even in the worst cases, however, there occur, not unfrequently, accessions which go no farther than the first stage, termed by some writers, "sub-epileptic seizures." Instances are given to which I can add two from my own practice, in which there happened, but once or twice in many years, the falling and convulsion, which are characteristic of the malady. Each of my patients was affected with a modification of the aura, or a morbid sensation which I could not but refer to that condition.

Among the phenomena of this first stage are, intense pain in the head, vertigo, vomiting, great mental excitation, with or without confusion of ideas, great mental depression, often with weeping; a disposition to syncope; petulance, and fits of causeless anger; unsteady gait; a disposition to run forwards or backwards; cramps in some muscles, and paralysis of others; roaring in the ears, or flashing of light before the eyes; morbid perception of odors, tastes, and colors; one of my patients was always sensible of "a green taste," as she phrased it, by which I understood a consentaneous impression made upon the optic nerve, presenting the color green, and an undefined impression on the gustatory nerve, which she confusedly connected with it. The whole paroxysm has been known to consist of a suspension of the faculties of the mind during which, for a brief period, the patient put on a fixed look, sat rigidly, or, perhaps, fell to the ground, occasionally muttering over and over the last word or syllable of the interrupted conversation. These imperfect or sub-epileptic seizures will comprise, I am disposed to think, the cases of *catalepsy*, so called. Of these I have seen two. One of them was always conscious of the aura, which, in her, originated in the inside of the thigh, near the groin, and was attended with vertigo, some nausea, and great general distress, mental and bodily. She became aware that this uneasiness was always diminished, and the full development of an attack prevented, by pressure made on this part; and this pressure, she affirmed, not only gave such negative relief, but was productive of a high degree of positive pleasure. She would request from her attendants, therefore, the most violent pressure, and although, for days after, the limb would be bruised and swollen from the force applied, she always declared her anxiety at the time, that it should be continued and increased. In this case, the attack sometimes advanced into the second and third stages. It never occurred to me, however, to see her convulsed. Her limbs, and trunk, and neck, were rigid. The arms, legs, and fingers, if bent into any position, retained it steadily; and though she occasionally spoke, in milder paroxysms, she always stated that she was sensible of the total inability of her will to move or contract any muscle. Prichard regards cases of the kind I am describing as "partial epilepsies." Heberden speaks of them as "antecedents or substitutes for true epilepsy" (quasi vicem ejus implet). Some French writers call them "petit mal," "vertiges épileptiques."

A fully formed epileptic paroxysm, however, often invades without warning. Suddenly, or as the case may be, after the occurrence of some of the symptoms above recounted, the patient utters a cry, or silently falls or is thrown to the ground, generally backward; the head is drawn to one side. The body and limbs are for a moment rigid, perhaps strongly bent; the eyes opened widely and vacantly, and the countenance fixed; the complexion pale or livid, for the most part, though sometimes flushed. Convulsions now come on, with horrid distortion of the visage, and rapid rolling of the eyes, or strabismus; the head is rotated or tossed in every direction; the hands clenched; the limbs drawn up and thrown out; the tongue protruded and caught between the teeth, the lower jaw being sometimes moved quickly up and down, and at other times the mouth forcibly closed. The patient moans piteously, or now and then screams out; the breathing is quick and loud, and a bloody foam gathers upon the lips. The pulse is felt with difficulty; I have usually found it very frequent. Urine, flatus, and fœces are often discharged; and in males, there are very often erections, with ejaculation of semen or prostatic mucus. Gregory says, even in infants "erigitur quoque penis; in adolescentibus semen ejicitur, et sæpius, urina ad magnam distantiam prorumpit." He refers here, specially, to what he calls the tetanoid form. The violence of the convulsions is such as to have broken the teeth; Van Swieten saw the jaw dislocated; Burserius and Cheyne, each, give a case of dislocation of the arm. The strabismus is said to have remained incurably permanent. The duration of this horrible state is various, from one minute to ten or fifteen being, perhaps, the average. Copeland, however, says he has seen it last more than four hours, and quotes Esquirol as having witnessed a duration of five hours. These, I suppose to be instances of rapid repetition of the fits, which may, indeed, be indefinitely prolonged in succession to seven, and, as in one recorded case, to ten hours.

The third, or, as I have denoted it, the soporose stage, comes on with an abatement of the convulsions; the patient sighs, moans, tosses restlessly, perhaps regains partially his consciousness, but generally sinks into a deep, yet apparently uneasy slumber, often with stertor and subsultus tendinum. The sleep gradually becomes more profound and natural; the breathing easier, fuller, and less noisy; the pulse slower and softer. On awaking, he complains of headache and vertigo; his eyes are suffused, with enlargement of the pupil, and some difficulty in directing their motions; the tongue is lacerated and sore; the muscles of the limbs and trunk fatigued and stiff.

Epileptic paroxysms are seldom fatal; they occasionally terminate, as we are told, in apoplexy or paralysis. The habitual repetition and permanent establishment of the disease, however, in general produces the most serious and melancholy result; imbecility and insanity being recorded as among the most common. Yet many escape these evils, and retain, as did Napoleon, Mahomet, Cæsar, and probably Alfred the Great, their mental powers unimpaired. Cheyne gives an example of a friend of his, "whose comprehensive, well stored, and active mind, remained unclouded for seventy-three years."

Epilepsy may commence soon after birth, in early childhood, at puberty, in adult years, in advanced life. Copeland gives an instance of its invasion after forty. "I have noted," says Heberden, "several who had begun to be epileptic at almost every year between twenty and fifty; a few have fallen into it at sixty; and I saw one, whose first attack was in the seventy-fifth year of his life, and from that time, he was often visited with it, for at least five or six years, and, probably, as long as he lived." Heberden, Soemmering, Cheyne, and Elliotson, regard males as more subject to epilepsy than females. Esquirol and Foville, hold the opposite opinion.

Nothing can be more uncertain than the recurrence of these paroxysms. In some instances, the periodicity, which forms so remarkable and obstinate a characteristic of this formidable malady, seems at once established, and the attacks return monthly, weekly, nay, daily. Some assert, that they most regularly come on at the moment of falling asleep. I have observed, on the other hand, that a very common time of attack is the moment of rising; whether this be from change of posture, or connected with the transition from the sleeping to the waking state, I cannot decide. Some patients are so fortunate as to pass months or even years between the fits; in these the invasion seems casual, and has arisen, probably, without definite predisposition, from the influence of transient causes; or, perhaps, great caution has been instituted, or early and persevering resort to proper measures of prevention or cure.

"The waking and sleeping states," says Romberg, "exercise an undoubted influence over the paroxysms. Epileptic subjects, who have their fits when asleep, are attacked also during broad daylight, if they yield to Morpheus." Marshall Hall advises on this account that such subjects never be allowed to sleep soundly, but that they be waked always from time to time. The former high authority tells us also that "the planetary influence of the moon, especially when new and at full, was known to the ancients; and although here and there doubts have been raised against this view, the accurate observations of others have established its correctness." Numerous cases are on record of the exactness of its periodicity.

The condition of the patient during the *interval* deserves our attentive study. Sometimes he appears to enjoy entire health; but this is not the general fact. Delirium remains for a longer or shorter time; trismus; aphonia, in greater or less degree; dysphagia; tympanites. Loss of memory is among the most familiar of the effects of a paroxysm; so is irritability of temper. The expression of countenance changes, becoming coarse, or fatuous. Romberg dwells on the intolerance of bloodletting, and the remarkable tolerance of nauseating drugs in epileptics, as also upon their general insusceptibility of epidemic and contagious diseases.

The *general prognosis* is usually thought to be highly unfavorable, and so indeed it has ever appeared to me. I have known and heard of very few cures of epilepsy, although something may almost always be effected in favor of a patient by proper treatment. We may very reasonably expect to diminish the frequency and violence of the fits; but this is all I venture to hope for. A very different view of this matter is given, however, by a recent writer, M. Herpin, of Geneva, whose essay received a premium from the French Institute. Of fifty cases he tells us there were "cured by medicine more than one-half: ameliorated, nearly one-fourth: incurable, only one in four." He calculates the spontaneous cures at only four per cent. If this be true, it is perhaps among the most signal triumphs of the divine art of healing. Of the *special prognosis*, I am disposed to think that there is a difference between centric or idiopathic, and eccentric or sympathic epilepsies; the latter being most curable. Herpin seems to regard no element as of importance except the number of fits suffered up to the time of commencing the treatment: as more than half, generally taken, of the subjects of epilepsy are cured, so of those who have had less than 100 fits, seven in eight get well; beyond 500 fits, none recover.

Some weight must be ascribed to the condition of the patient and the causes of the attack. Lead poisoning may be remedied; worms may be expelled; the intemperate and sensual may be warned and reform; the irritation of dentition, or of carious teeth, will pass away, or may be removed. Long and irregular intervals afford more opportunity for effort, and are less oppressive by expectation. All these are comparatively favorable contingencies. The reverse and unfavorable are brief intervals—disturbed with either local or general disorder of the body; tonic spasm or paralysis; or amnesia in marked degree, or violent delirium; or amentia and imbecility.

The *pathology* of epilepsy, difficult and obscure, affords an ample field for ingenious hypothesis and theory. Three views of the subject still find supporters among the best minds of the profession, and must be briefly stated here. Parry taught that all the phenomena were produced by arterial determination to the brain, and that the force of the momentum, morbidly increased by whatever occasioned this determination, was the true cause of the whole train of consequences. Many of the familiar symptoms accord with this opinion. The flushing of the face, redness of the eyes, and throbbing of the cerebral vessels so often noticed, are of this kind. The effect of compression of the carotids, reported by Parry, Romberg, and others, seemed actually to establish the doctrine. Solly goes a step farther in explanation, and ascribes the determination to the head, whence the "sanguineous plethora" of Esquirol and others, to "deficient contraction of the muscular coat of the capillaries of the brain." A curious case given us by Pereira, vol. i. p. 384, may be alluded to in this relation, in which the pulse was always suspended in one arm during a paroxysm. After death it was found that the artery in this arm was a branch from the vertebral. The carotids have been more than once tied for epilepsy, with less effect than was expected. I saw Dr. Mott tie the second in a bad case, which was not at all benefited.

Instead of this arterial determination, venous congestion, which, I believe, is scarcely by any one denied to be a uniform condition in epilepsy, is supposed by another body of pathologists to be the source of the convulsions. This notion forms the basis of Marshall Hall's ingenious theory of epilepsy, and the practice which he so zealously advocates as applicable to its cure. Foville states that "the brain of patients dying in the fit is always found congested," and considers suffocation to be the mode of death. Dr. Marshall Hall, beginning at the commencement, offers a lucid rationale of the events in the order of their occurrence, which may be briefly stated as follows:—

The earliest symptoms of a fit of epilepsy are muscular spasms about the neck, drawing the head down to one side, by which spasms a compression is exerted upon the subjacent veins; the internal jugular vein is compressed by the sterno-cleidomastoid and the vertebral by the scaleni. The blood is thus obstructed in its return from the brain; laryngismus follows, the glottis being similarly constricted; hence suffocation and convulsions of the trunk and limbs. To prevent this suffocation and its train of terrible consequences, he proposes tracheotomy; and this view is alleged to be sustained by cases already authentically reported, in which tracheotomy has cured or prevented epilepsy.

Brown-Séquard, to whose researches modern physiology and pathology owe so much, while he produces in animals epileptic or quasi-epileptic convulsions by injuries inflicted on the *spinal cord*, adopts with little modification these views of the ingenious Englishman. They are not, however, universally received.

The facts alleged are on the one hand doubted or denied, and the reasonings of Marshall Hall impugned by Romberg and Todd. The former says that "no proof is given that such compression is really effected by the spasm of the cervical muscles. Besides that in hysterical paroxysms and the convulsive throes of tetanus there is no unconsciousness; while in the abortive forms of epilepsy the psychical disturbances prevail, scarcely any convulsive action being manifested."

Todd objects that convulsions may be excited, by strychnia, for example, in dogs perfectly tracheotomized, with free ingress and egress of air, and in dogs whose muscles of the glottis were paralyzed by section of the recurrent nerve. He proposes, instead of Solly's undue and too rapid or explosive generation of nervous force by arterial determination and excitement, and Hall's morbid influence of suffocation and congestion combined with spasm, a "humoral theory of epilepsy"—in which it is assumed that "it consists essentially in the generation of a morbid matter which infects the blood; which morbid matter has a special affinity for the brain, or certain parts of it. The peculiar features of an epileptic seizure are due to the gradual accumulation of this matter in the blood, until it reaches such an amount that it acts upon the brain in an explosive manner, exciting a highly polarized state of the brain or its parts, which then discharge their nervous power upon certain other parts of the cerebro-spinal centre in such a way as to give rise to the phenomena of the fit." "The source of this morbid matter is probably in the nervous system, perhaps in the brain, and may owe its origin to imperfect nutrition."

This morbid matter is conjectured to be urea, because in the experiments of Prevost and Dumas convulsions followed the excision of the kidneys. Frerichs considers it to be the carbonate of ammonia, the result of the decomposition of urea in the blood. This humoral doctrine—a mere hypothesis—finds some slender support in the intervals—a period of supposed accumulation, and in the asserted facts that a patient is in a better condition of health after a fit than before it, and after a fully developed, than an abortive fit.

Autopsy.—Beyond mere congestion of the vessels of the brain and spinal cord found uniformly in bodies dead of epilepsy, nothing clearly instructive, peculiar, or characteristic has been discovered, and the conclusion which Esquirol announced years ago in the *Dict. des Sciences Méd.*, is equally true now: that "the labors of pathological anatomy have not hitherto thrown any light on the immediate seat of epilepsy." Softening of the brain, with gelatinous degeneracy and discoloration; effusions of serum within the ventricles and on the surface; ossification, between the laminæ of the membranes; alterations in the condition of the pineal and pituitary glands; depression of bone from fracture of the skull; the existence of spiculæ or bony tumors projecting inwards, and irritating; obstructions of the veins and sinuses from fibrinous concretions have been recorded. Sulphate of lead has been found in the substance of the brain. Esquirol found in several cases a deviation from the natural appearance of the spinal cord either in its medullary substance or its investing membranes. In one such, Morgagni saw exceeding turgidity of the vessels of the posterior surface of the membranes of the cord, and even of the minute spinal nerves. Equally uncertain and indeterminate is the list of lesions of different portions of the body with which this malady is said to have been associated.

The *causes* of *epilepsy* are exceedingly various and diversified—and as acting on the one hand directly upon the sensorial system, and on the other indirectly through morbid impressions and changes wrought in the first instance upon other systems, they suggest an obvious division of epilepsies into idiopathic (centric) and sympathic.

The first will include all the lesions of the brain or any of its parts, the cerebellum, the medulla oblongata or the medulla spinalis, which have been spoken of. Certain poisons seem to act, also, in this direct way upon the brain, as alcohol, of which, unhappily, we see too frequent examples, and lead, of which Tanquerel des Planches himself observed not less than thirty-seven instances. Here, too, we may mention blows on the head, or falls and insolation. Under this category will come the cases which are brought on by violent passion and emotion, terror being the most of all fruitful in such consequences; and those which have commenced in the diffused excitement of public assemblies, religious in our own time, political among the ancients, whence the Roman name of the disease, morbus comitialis. Much, but not undue, stress has been laid upon the principle of sympathy or imitation, which engenders a proclivity so strong and irresistible in our species at all ages. To this principle has been attributed, not only the spread of the disease from one individual to another, as among the children of the Haerlem Orphan House under Boerhaave, but, as is affirmed by Cullen, "it may even fix the disease in good earnest upon a knave, who, for whatever purposes, simulates it."

The second class of causes affect chiefly the digestive and genital system—the respiratory and circulatory showing little influence, as observed by Romberg, in this connection. Verminous irritation, and the annoyance of teething, often excite convulsions in children. It is not certain whether we should arrange here those which precede the eruption of the exanthemata; they are, however, in all their phenomena, precisely similar, although transient. In all fevers, indeed, the mobile and irritable constitutions of young children are liable to convulsions. Metastatic epilepsies are alleged to have occurred from the abrupt cure or sudden repulsion of chronic cutaneous affections, the drying up of old ulcers, and the cessation of hemorrhage from the piles.

Epilepsies from circumstances which impress the periphery of the nerves, afford curious and interesting phenomena. Sometimes these are attended with a peculiar sensation concerning which there has been some dispute—the aura epileptica—so called from its having been described as "a cold creeping vapor." The correctness of this description, M. Herpin denies altogether, and affirms that "a partial tonic convulsion, rapidly passing from one muscle to another," preceding the loss of consciousness, is the only phenomenon which approaches the nature of the so-called aura. But there is proof beyond doubt that it is often a mere sensation, commencing in the same spot, in the same way, and passing towards the head, which when it reaches, the paroxysm is at once developed.

These peripheral points present great diversity. James mentions a case cured by amputating the great toe, the sesamoid bone of which was supposed to be dislocated. Short tells of one in which there was a neuroma of the size of a pea in the vicinity of the muscles of the calf of the leg; De Haen another similar, and Henning two others; traction by cicatrices on the foot; injuries by venesection to nerves, are recorded here. Disorganization of the right knee from injury brought on epilepsy in one of Romberg's cases, in which "the aura commenced as a creeping sensation in the large toe of the right foot"—not at the diseased point. "From thence it mounted up along the inner surface of the leg and thigh, and ended in the epileptic seizure." Morgagni tells us of a priest in whom the liver being disordered, "the accessions were generally preceded by a feeling compared to the ascent of vapor from the hypochondriac region to the head." Excision of a piece of nerve at or near the spot has been resorted to, and sometimes with success, as by Astley Cooper. In an operation by Dieffenbach, a piece of glass was found in the excised portion. Sometimes no discoverable abnormality exists at the point where the sensation or aura commences. This was the fact with two of my patients already alluded to. Copeland says "the sensation of a cold or warm aura proceeding from some part and ascending to the head, but very rarely descending from the head to another part, is one of the most common precursors of the fit. In some cases, the aura has been felt to terminate at the epigastrium. Fernelius mentions its occurrence at the vertex; and Schelhammer, a case in which it began at this part and proceeded to the arm." Whether connected or not with palpable change anywhere, it has often been found that a ligature tightly bound around a limb, above the point of its origin, has been an efficient means of preventing an attack.

The *diagnosis* of epilepsy refers only to the confusion so readily made with hysteria in the female subject, and the fact that it is the malady, above all others, most frequently simulated by malingerers of all classes, beggars, vagabonds, soldiers, and slaves. Cheyne and Copeland dwell on the invasion with a scream; the indifference as to mode and place of falling; the degree of anæsthesia; the distortion of features and lividness of complexion. In protracted cases, the consistency and relevance of the replies given will aid us much. After all, there are cases difficult to decide upon, and in these we must lean to the side of charity.

The *treatment*. In the very first instance we are called upon to distinguish the nature of the attack and separate sympathic from idiopathic epilepsy. In the former we may institute, hopefully, a rational method; in the latter, we shall be driven to a mixed course, in which empirical remedies, perhaps, predominate.

1. In cases associated with, or dependent upon derangements in the digestive system, the purgative course carried on persistently for a long while and gently, will effect much for our patient. Turpentine with castor oil has been selected by some, and I think well of it. I have used rhubarb with small doses of camphor with benefit. Vermifuges may be required. If there be hepatic disorder, a slow and mild mercurial course promises good results.

2. The genital system is very often, and especially in females, the primary seat of disturbance, from which, says Jourdan, "the phenomena of its access spread themselves by irradiation." It is associated with amenorrhœa and dysmenorrhœa; in both sexes, with undue venereal excitement, gratified and ungratified, and especially with solitary indulgence. In males, it has been brought on by the venereal orgasm. The knowledge of these relations suggests the modes of relief.

3. In metastatic epilepsy, the frequency of which has been perhaps exaggerated, we must endeavor to reproduce the original irritation at its first seat; by the warm bath, to solicit cutaneous determination; by escharotics, to reproduce old ulcers; by irritating enemata, to bring back hemorrhoids; by warm poultices or blisters, to re-excite arthritic inflammation, gouty or rheumatic, too abruptly repelled. In exanthematous epilepsy, if we can distinguish it, we relieve the determination to the head by affusion of cold water, and application of cold cloths, while we derive to the bowels by proper cathartics, and to the skin, by hot baths and diaphoretics.

4. The "aura" will demand of us a careful examination of the point where it commences. If any local change be there discovered, I would apply the resources of surgery to take away what could not be corrected, by excision or amputation. If upon a limb, I would advise a ligature kept above it, to be tightened upon every premonition. Very firm pressure on the part itself will sometimes prove beneficial.

We must not neglect the advice of Todd, whatever we may think of his humoral theory, to inquire into the condition of the kidneys, and their secretion. If that be deficient or morbid in any way, proper measures to restore the function to its normal state should be immediately instituted and persevered in.

In the majority of instances that come under our care, however, there will either be no perceptible connection of the sympathetic character to guide us in our treatment, or, if the case be of long standing, it will have lost altogether this secondary or dependent relation, and will have become firmly fixed upon the constitution, either by involvement of the cerebro-spinal centre, or by habit. The indications divide themselves obviously under two heads—the management of the subject during the fit or paroxysm; and that which, in the interval, has for its object the prevention of its recurrence and the entire restoration of the patient; or, at least, the prolongation of the interval between his attacks.

During the paroxysm, very little can be done; nay, it is not always safe to attempt any interference. The patient should be prevented from injuring himself, by the gentlest effective restraint. A twisted handkerchief, or wedge of some kind, should be thrust into the mouth, to prevent the laceration of the tongue. All tight clothing should be loosened, and a pillow put under his head. The common practice of nurses, of endeavoring to force open the clenched hands of the epileptic, is highly applauded, and strongly urged by Dr. Reid, who, in the *Dublin Transactions*, declares that the paroxysms may always be thus shortened. In a case recorded in one of our periodicals, I find it incidentally mentioned by a patient, in her account of her symptoms, that if, at the approach of a fit, her hand is unclenched, and the fingers forcibly extended, the attack will be warded off. If the face is flushed and turgid, I employ cold affusions to the head, or lay upon it cloths wrung out of cold water. When the convulsions subside, I endeavor to render the patient's position comfortable, that the sleep into which he falls may refresh and restore him, and take care that his extremities are warm, and that he has free air about him.

Instances occasionally present themselves which require more active interference, though I think not often. In recent or first attacks, in young and plethoric subjects, and where a dilated pupil, and inordinate degree or protraction of insensibility after the convulsions have ceased, and a stertorous noise in breathing give reason to dread an apoplectic tendency, venesection must be resorted to, and blood drawn as freely from a large vein as the pulse will permit. I need not say, that this operation is not to be indiscriminately or carelessly performed, however. "To open a vein upon account of the fit, exclaims Heberden, "is a needless waste of blood, which may weaken the patient, but not the disease."

I have had occasion to mention two cases in which I saw violent convulsions brought on by the use of the lancet. Copeland gives two instances of decided injury inflicted in the same way. The best rule is, not to meddle too much with the epileptic paroxysm in any stage of it. A young lady, long my patient, had one day passed through the convulsive stage, and was lying tranquil and soporose, when a friend entering, and being much alarmed by her ghastly aspect, seized a pitcher and dashed water forcibly into her face. She was immediately reattacked with a violent and protracted convulsion, the worst I ever witnessed.

The management of the epileptic, in *the intervals*, is next to be considered, and constitutes vastly the most important portion of the treatment. It may be properly divided into two parts, the rational, and the empiric, and we cannot be said to have done our duty fairly to our patient, until we have exhausted all the resources referred to under either phrase. As it is but too plainly manifest that we have not hitherto succeeded in detecting the intimate nature of the morbid action in which the disease consists, or upon which its train of symptoms is immediately dependent, our first endeavor should be to ascertain, if possible, the true condition of the patient, from which we may infer the predisposition under which he labors; and to procure an accurate history of the remote or exciting causes which develop the attack. The predisposition may be transient or permanent. The exciting causes may be such as we can remove, control, modify, or counteract. All these points are to be duly considered. When these causes are apparent, something can always be done for our patient: when they are remediable, we may, with some confidence, endeavor to inspire him with cheerfulness and hope; and even when they are beyond the reach of our means of cure, we must still strive to diminish the intensity of their influence upon the constitution.

The first of the rational measures is indicated by the general condition of the subject. If of full, robust, and plethoric habit, his diet and mode of living must be carefully regulated. His food should be chiefly of vegetable material, and no more than is necessary to sustain a due degree of animal vigor. It may, in such instances, be proper to abstract a little blood. I prefer the lancet, others choose to cup the back of the neck, or the temples, or apply leeches to the angle of the jaws. These measures are more clearly called for under such premonitory circumstances as sometimes give warning of the approach of a paroxysm—pain or throbbing in the head—tinnitus aurium—flashing of light before the eyes, vertigo, etc. A total abandonment of all stimulating drinks is necessary as the very first step to be taken. Intemperance is, perhaps, among the most fruitful causes of epilepsy, both predisponent and exciting.

In the class of cases contrasted with such as I have been describing, those, namely, which present paleness, muscular feebleness, general debility, and apparent anemia, an opposite course is required. Here, a generous and even stimulating diet must be described—habits of exercise—tonics, change of air. Some advise wine and malt liquors; but I am, on the whole, persuaded that the chance of injury from these is greater than the prospect of benefit. Iron has appeared to me the best of our tonics here. Zinc has been highly eulogized; the oxide, or flowers of zinc, is most often used. It is given in as large doses as the stomach will bear, without nausea or vomiting—from 5 to 20 grains. Gaubius, Percival, and Hufeland report favorably of it. Rush states that he cured a case of ten years' standing with it. The sulphate is also employed. Two of the salts of copper are said to have been exhibited with success. Cullen recommends the sulphate; and we have satisfactory testimony to establish the claims of the sub-sulphate of copper and ammonia, the cuprum ammoniacum. The vegetable tonics seem less adapted to our purpose here than the metallic, and have been abandoned after fair and persevering trial. An almost universal approbation is given to the use of purgatives upon the Hamiltonian system. Their influence, I suppose, is chiefly revulsive, though they probably act as alteratives and deobstruents, removing any obscure visceral affections which may have disordered the sensorial functions. The drastics have been generally preferred; they are given in small dose, with great perseverance—jalap, scammony, aloes, gamboge, and elaterium, are thus used. I select rhubarb, combining it with an alkali, and adding some aromatic, or moderate doses of camphor. Under this course, adhered to with constancy for months and years, have occurred the most satisfactory examples of cure and of relief, which I have witnessed among epileptics. I have said that these cathartics are to be administered in moderate doses, and a gentle but uninterrupted action on the bowels maintained. If properly managed and duly watched, this treatment will improve the health and condition of every patient—instead of debilitating, will be found productive of increased strength, and will at least protract the interval between the fits.

Next I mention, under this head of rational remedies, the several modes of counter-irritation. Of these, each practitioner has his favorite, and, indeed, a preference among them will be occasionally indicated by the circumstances of the patient, and the contingencies of each case. The hair should be worn short, or, indeed, in bad cases, shaved from the head. Blisters are advised to be applied over the scalp, behind the ears, to the back of the neck. While some keep them open with stimulating dressings, others allow them to heal, and repeat their application successively to different parts of the surface. Issues and setons are established and inserted, not only about the head and neck, but in the arms and breast. Caustics of various kinds are eulogized, the nitric acid, pure potash, etc. Galvanism has been experimented with by several physicians, and we have favorable reports of its effects from Drs. Duncan and Mansford.

I ought not, perhaps, to omit the mention of the fact, that the trephine has been employed in the cure of epilepsy, in cases where circumstances indicated lesion of the brain, from a morbid condition of the bony envelop of that organ. The operation is discussed and advocated by some of the earlier writers. In modern times, instances of its successful performance are recorded by Blake, Guild, and Elliotson, the last-named of whom "refers to a case in St. Thomas's Hospital, where the trephine removed a piece of bone with a spicula from its internal surface, and cured the disease." It is affirmed that Professor Dudley met with entire success in a case in which a bony tumor was attached to the inner plate of the piece taken out.

In Professor Pope's Report to the Miss. Med. Assoc., 1852, we have many cases of successful operation referred to. Dr. S. Smith, of New York, has collected twenty-seven cases operated on in the United States, of which the results are thus stated: "Of twenty-two males, five females—age from fourteen to fifty—duration of disease from three days to twenty years; there were cured seven, about one-fourth; unrelieved none." They were all benefited, more or less, by suspension of the attacks; in many they returned after a short time.

Compression of the carotids, as advised by Parry, pressing the thumb upon them on a level with the superior border of the cricoid cartilage against the vertebræ, is strongly recommended by Romberg, who assures us that he has "found the proceeding to be an effectual prophylactic, if employed in patients who have forewarnings of their attacks, and are able to apply it in time."

As it is not every patient who has intelligence and presence of mind to make this compression, and we possess no mechanical means for effecting it, nothing was more reasonable than that the surgeon should have been called on to ligate the artery. A temporary good result has always followed, I believe; but the parts soon accommodate themselves to the new demand, and anastomosis probably supplies sufficient blood to the brain to reproduce the malady in force.

Dr. Marshall Hall, ascribing to suffocation and congestion combined the worst features of this terrible malady, proposes to relieve it, or, at any rate, to diminish its terrors, and reduce all the paroxysms to that abortive development which the French call "petit mal," by the performance of the operation of tracheotomy, and the keeping open of the orifice with a very ingenious and simple little instrument devised by himself. Already there are reports of its success from more than one respectable physician, and the experiment will, doubtless, be extensively tried.

Professor E. Watson, believing, with Dr. Hall, that laryngismus is "the essential cause of much that is formidable in the epileptic paroxysm, and that it is of early occurrence in every severe seizure," offers as a safer and less objectionable substitute for tracheotomy, the application of the solution of nitrate of silver to the glottis, which he affirms will "exhaust the excitability of the laryngeal nerves, and thus render the patient, in a shorter or longer time, insusceptible of laryngismus." He thus converted, in one case, the "*grand*" into the *petit mal;* "the fits becoming more like short faints than regular convulsive paroxysms."

Brown-Séquard, after much ingenious experiment and very full discussion of the whole subject, advises a plan of treatment consisting of, 1. Cauterization of the larynx with a strong solution of nit. argent. 60 grains to aq. ℥j every day for five or six weeks; 2. Actual cautery to the neck over the spine, once a fortnight for two or three months; 3. Exercise and gymnastics; 4. Oxide of zinc or ammoniated copper, to be taken in full doses; 5. Tracheotomy and section of a nerve occasionally, when indicated by threatened suffocation, and a constant or special aura.

The empirical treatment of this justly dreaded malady consists in the employment of certain remedies, whose *modus operandi* in the case is unknown or conjectural, and whose reputation is the result of tradition and experience. The most ancient of these antiepileptics is the mistletoe of the oak, probably a relic of British Druidism. There is much evidence in its favor from Haller, De Haen, Van Swieten. Frazer, more recently, records nine cures made with it. He prescribed it in powder, in a camphor emulsion. Camphor and valerian are both to be enumerated here. Digitalis, long known as a vulgar remedy, has been eulogized by Corrigan, and loudly by Solly. Sharkey recites several cases of recovery under its use. He exhibits it in strong infusion in porter, and in large doses, until the patient is fully narcotized and prostrated. I saw it fairly tried in a single instance, that of a young physician, who was kept profoundly under its influence for several days, during which he seemed, indeed, at the very point of death, with abundant and frequent vomiting, vertigo, dilated pupil, with a pulse between 30 and 40; but all ultimately in vain. In our country it is most by Cornell, who employs it rather less energetically, but, as he affirms, with gratifying success.

The nitrate of silver has been a very favorite prescription. Baillie, Roget, Johnson, Cooke, and Copeland recommend it. It is given in doses of ½ gr., and increased to six or eight daily. It brings on sometimes an eruption, which is said to promise favorably. It requires to be long persisted in, and then may and does occasionally discolor the skin, in a most ghastly and permanent manner. The oxyde and chloride are said to be free from this very serious objection, and to produce very much the same benefit. The hydrocyanate of iron has lately been added to this list of antiepileptic remedies. Belladonna used as a palliative, by Fredericq, diminishes the number and violence of the fits. Atropine is asserted by Lange to have cured six out of ten cases; in the dose of one-hundredth of a grain, persisted in for several weeks. It failed in four. Todd reports favorably of the sumbul.

Herpin attained the astonishing success of which he boasts, chiefly with oxyde of zinc. It requires great perseverance to succeed with any remedy. He commenced with from six to eight grains daily, in divided doses, one hour after each meal; every week, two grains daily were added, until a dose of forty-five grains was reached. At that rate it was continued for three months. As much as four ounces have been given during the treatment. He has also used the ammoniated sulphate of copper, though less successfully. In one of the worst cases a cure was effected by the union of zinc with belladonna.

TETANUS.

This terrible malady presents the following well-marked characters: There are spasms, affecting the muscles of the face, trunk, and limbs, of all the muscles, indeed, supplied by the cerebro-spinal nerves; in its progress, perhaps, involving all the muscular tissues of the body. These spasms or muscular contractions are enduring and rigid, yet mingled with occasional and more intense contractions, of transient and convulsive violence. There is also a "permanent exaltation of the reflex function, in consequence of which every stimulus acquires a morbid influence in exciting such convulsions."

These spasms are usually partial at first. The muscles of the face are so affected as to give a peculiar expression—approaching to or resembling the risus sardonicus; the jaws are stiff or locked—trismus; next, the muscles of the back are contracted so as to bend the subject backwards—opisthotonos; rarely, the sterno-pubal muscles are thus affected prominently, bending him forwards—emprosthotonos; still seldomer, those of one side are violently drawn—pleurosthotonos; when the whole body is thus equably rigid with universal spasm, it is tetanus. The condition termed opisthotonos is most common: I have often seen the patient curved like a bow for several seconds together, and resting on the back of his head and his heels.

Some of the muscles continue permanently contracted in the mass of cases, as those of the jaw and face, the cervical and abdominal; besides this there are respiratory spasms and convulsive agitations which alternate with remissions or comparative intermissions, shaking the whole frame, and inflicting upon the unhappy sufferer the most intense agonies. These are excited by the slightest causes; an attempt to swallow, or speak, or move a limb; the bed or the floor being shaken; a sound or touch which startles, or an emotion of the mind.

Among the earlier, more vehement, and more constant sufferings complained of, is a pain at the point of the sternum, reaching to the back, probably diaphragmatic; there is dysphagia also; the œsophagus being permanently contracted, or contracting immediately upon the attempt to swallow; Larrey declares that he found the introduction of a flexible tube, which he attempted, absolutely impossible.

The violence of muscular contraction is almost incredible. In a case which occurred under my care, a little boy, a pet negro slave, who had been slightly hurt a day or two before by a fall upon his back from a horse, that had inflicted neither wound nor perceptible bruise, was sitting in a child's high chair, near his mistress, by the fire. Suddenly he was bent backward forcibly, and thrown out of the chair some distance upon the rug, to the utter astonishment of all present and his own. Being replaced, the same thing occurred again and again, when I was sent for. On my arrival, I found his jaws closely locked, and the disease fairly developed. The muscles have been ruptured by their own action—the sterno-pubal, the cervical, and the psoas major; nay, we are told by Deporte of an instance in which both the thigh-bones were thus broken. (Williams, *Enc. Met.*) As the case progresses, the dyspnœa, anxiety, and agitation become more and more urgent. The pulse grows exceedingly frequent; the skin is bathed with sweat; the bowels are costive, all the sphincters being closely contracted; the urine is scanty, and seldom passed; the voice rough and feeble. The patient sometimes dies suddenly, as has been conjectured, from spasm of the diaphragm or of the heart itself, sometimes suffocated or strangled during the throes of a violent convulsion, perhaps from laryngismus; and sometimes peacefully and calmly, from absolute exhaustion, after seeming relief.

The *duration* is very various. Fatal cases are seldom protracted beyond the fourth day, and may terminate within a few hours; but the disease may last, in a mitigated form, for weeks. Even of these milder instances, some die from the access of a paroxysm of unexpected vehemence.

Tetanus is obviously divided into the primary and secondary forms. Primary, or *idiopathic tetanus*, is certainly rare in this country; I have met with but a single example. It is doubtless more frequent in tropical climates than colder regions, and among the dark races of India. Peet, of the Bombay Hospital, declares that it occurs oftener in that district than anywhere else; and Chalmers uses language which clearly implies a far greater frequency of it in South Carolina in his day than at the present time. "Though the tetanus and opisthotonos attack those," he tells us, "who either lie abroad in the damp air at night during the summer, or are exposed to the rain, and have not a ready opportunity to put on dry clothes, yet these complaints generally occur towards the end of autumn, when the weather is changeable. But as they appear at all times of the year, so they are commonly owing to the above causes, except when they ensue from wounds, amputations and ulcers."

Trismus nascentium may be doubtfully placed under this head. It has been usual, I am aware, to ascribe it to the wounded condition of the umbilicus, but many reasons have been plausibly urged against this view. Dr. Marion Sims, a close observer and distinguished surgical obstetrician, attributes it to injury done the encephalon by pressure of the occipital bone upwards, the child being usually laid on its back; but the utmost care as to the position of the infant upon the side, has sometimes failed to prevent it. Want of cleanliness and ventilation are assigned by some as its sources, and they may be predisposing causes among the blacks, and in the lower classes; but the disease occasionally, however rarely, carries off children in the better orders; I once saw it, and but once, in a white child, the circumstances surrounding whom were in the highest degree desirable and hygienic.

I would suggest the possibility that spontaneous tetanus may sometimes fail to be recognized or acknowledged. We inquire at once and most pryingly into the history of the subject, and almost invariably discover, of course, that he has not long since received some wound, or scratch, or bruise, or blow, which is unhesitatingly regarded as the sufficient cause of the symptoms. We know, too, that there are so many instances of the disease following close upon such trivial injuries, that this mode of reasoning seems plausible and correct.

Of the *secondary* forms of tetanus, the *traumatic* is by far the chief and most familiar. It attends wounds, and physical hurts of all kinds; it succeeds surgical operations performed with the greatest skill and care. It has been observed that lacerated, contused, and punctured wounds are most likely to produce it.

Tetanus is brought on by some poisons, of which strychnine is the most certain. All those which, in Todd's phrase, excite undue "polarity" in the spinal cord, or, to use other language, increase the intensity of reflex action, may occasion it. Two men having fallen into a soap-boiler's vat, were taken out asphyxiated and convulsed, and afterwards died of tetanus.

Symptomatic tetanus appears incidentally among the events or results of certain diseases. I saw it thus developed in the last stages of the only well-marked example of idiopathic myelitis (chronic) I ever met with. I have elsewhere mentioned my having read and heard of two instances in which it supervened most unaccountably in the progress of dengue. It is also said to mingle itself with the other appalling features of cholera asphyxia.

Causes.—The predisposition to tetanus is remarkably displayed in certain localities. I have already spoken of its frequency in Bombay. Larrey dwells upon the strong liability to it in Egypt. All its forms are abundant, as we are told, in the West Indies. It is a common belief that it is peculiarly apt to supervene upon wounds and operations on Long Island, N. Y.

Schleisner says that trismus nascentium carries off in Iceland an incredible number—sixty-four per cent. of the children born, dying of it between the fifth and twelfth day. Dr. McLean makes a similar statement concerning its frequency in St. Kilda, one of the Western Hebrides. The predominance of high temperature is regarded by surgeons generally as originating a tendency to traumatic tetanus. The dark races—the East Indian and the negro—are also considered specially liable to it.

The exciting cause of idiopathic tetanus is exposure to severe cold, or alternations of temperature, with predominating influence of cold and moisture. Williams says that "tumbling boys are frequently seized with this complaint." I do not understand why. But cases occur not rarely in a spontaneous manner, without any discoverable source. Trismus nascentium does not seem to me to be always satisfactorily accounted for. Traumatic tetanus presents itself very irregularly. Its relation to the condition of the wound has been carefully inquired into, but has been very variously stated. It is said to be more likely to supervene if any foreign body remain in the wound; if there be comminution of fractured bone; if a nerve be included in any ligature employed. Larrey thinks the detachment of the eschar a critical point of time.

Toxic tetanus has followed the action of poisons very different, if not opposite in their apparent influences; that of strychnine, which polarizes, and, as we are told by Elliotson, of tobacco, in enema one of our most potent relaxants, which depolarizes; and of sulphuretted hydrogen, as in Williams's cases, which does not resemble either.

Symptomatic tetanus displays a similar want of relevancy with the maladies of which it has formed an event or sequel, and from whose morbid actions it has most obscurely originated.

Autopsy.—Examinations post mortem, repeated with indefinite frequency and great care, have disclosed no characteristic lesion. In idiopathic cases, nothing has been discovered. In the traumatic, Williams, Gerhard, and numerous authorities, assert the same thing. "The morbid appearances are far from uniform," says Prof. Miller, of Edinburgh. "The brain seldom shows aught amiss, unless it be an unusual amount of serum. The spinal cord usually evinces manifest congestion, more especially at the origin of the nerves. The lungs are congested. The nerves at and leading from the part injured, show vascularity, enlargement, and other inflammatory signs, acute and chronic. Myelitis induces symptoms of tetanic character; but this is altogether different from true tetanus."

Pathology.—It is probably correct to refer it exclusively to the spinal cord as its seat. Magendie divided this column into as many sections as there are vertebræ in the animal, and found that strychnine still continued to render it tetanic. Yet it is not easy to set aside the statements of so competent an observer as Dr. Sims in reference to trismus nascentium and its dependence upon cerebral oppression and injury. Its elements are graphically set down by Romberg, as "spasm of the muscles supplied by the cerebro-spinal nerves, and permanent exaltation of the reflex function." It does not appear so clearly, however, as he maintains, that all the forms and varieties of tetanus are identical in nature. We ascribe idiopathic or spontaneous tetanus to cold and moisture chiefly; but traumatic tetanus, which is so constant an attendant upon wounds and operations in tropical climates, is comparatively rare in colder countries. Larrey had an appalling proportion of cases among those wounded at the battle of the Pyramids; while after the battle of Eylau, under exposure to extreme cold and great hardship, very few were attacked.

Diagnosis.—Its relations with rheumatism, hysteria, epilepsy, and hydrophobia, have been dwelt on. Rheumatic stiffness of jaws and limbs are associated with other symptoms, and do not present the exalted reflex action upon which Romberg lays greatest stress. Hysteria sometimes simulates tetanus, as every other disease almost, very closely; yet the phenomena are capricious and inconsistent.

The tetanoid form of epilepsy is transient, and followed by the coma of that dreaded malady. Hydrophobia has been by some regarded as tetanus, or as a form of hysteria, mingled with tetanoid symptoms. The history of the case will distinguish it. In tetanus the physical agitation is usually associated with remarkable clearness, calmness, and steadiness of mind; the hydrophobic sufferer undergoes indescribable tumults, both mental and bodily. In myelitis, which resembles it somewhat, the "exaltation of reflex action is wanting."

Prognosis.—This is universally considered very unfavorable. It has been usual to regard idiopathic as less fatal than traumatic tetanus; but Mr. Peet, who saw more of it than any other writer, says that it is more severe and destructive. The only case I ever met with died. As to trismus nascentium, I must acknowledge, with many others, I have never seen a case recover; I have seen numerous cases among negro infants, and but one white. The rapidity of progress in the early stages, the rapid recurrence of the more violent or convulsive struggles, the dysphagia and dyspnœa, these are the menacing signs. A distinction has been attempted of the disease into acute and chronic, which, if it could be made clearly, would assist us somewhat. It is commonly said, that if a patient survives nine days, he will recover. I have seen no traumatic case die after that time. Yet we must not hastily pronounce a favorable opinion even in protracted instances; in an apparently mild attack, a single spasm may prove fatal suddenly. Such was the termination of the spontaneous case I spoke of above, after lasting more than a fortnight, and exhibiting considerable alleviation.

The period of *incubation* is not determined. McGregor says it does not extend beyond twenty-two; Blane says, twenty-eight days. A case is on record of seizure on the twenty-sixth day after the injury. It may supervene with great promptness; some affirm, within twenty-four hours.

Treatment.—I am almost disposed to echo here the desponding declarations of McGregor, and those who, with him, regard the disease as indomitable. Not that we have not on record many instances of recovery from tetanus. Numerous examples of such are reported in which the cure is ascribed to venesection, to opium, to mercury, to the cold bath, to hot and vapor baths, to cannabis Indica, to belladonna, to tobacco, to the salts of iron, to turpentine, to cantharides, to exposure to cold and wet night air, to moxibustion, and to ice applied along the spine.

The French seem to have carried venesection, cupping, and leeching, to the greatest extent. Many pounds of blood have been rapidly taken from patients with alleged success. I have seen the lancet used often and freely without any benefit, and, indeed, some of the more recent authorities pronounce it injurious.

Of opium, the tolerance is prodigious. I have seen ounces of laudanum drank like wine at brief intervals, without any effect whatever. Bennett tells us of a case in which twenty grains of opium were given every three hours for several days together. I would administer the tincture always as advised in similar circumstances previously; Abernethy found thirty grains of the drug undissolved in the stomach of a man dead of tetanus.

Mercurials have been widely eulogized. The only two cases that ever recovered under my exclusive care were early and profusely salivated, and kept so for many days. One had been shot through the elbow; his arm being near the muzzle of the gun, the whole load went "clean" through the joint like a bullet. The other was the little boy referred to above, as attacked after a fall without wound or apparent bruise.

Two patients are recorded to have died in the cold bath; one by Larrey, the other by Elliotson. The event was probably determined by their reluctance and struggle. Such was the fate of one who was ordered the warm bath by Chalmers; he resisted violently, and died before he touched the water.

The cannabis Indica has been favorably spoken of by several physicians in Europe and America; but Peet, who gives reports of 260 cases in seven years, in the hospital under his care, and who enjoyed the best opportunities of experiment with it, active and fresh, in its native East, declares it to be "no better than other narcotics." Prof. Miller records "three fortunate cases under its use," and says that he has "seen it fail to cure, but never to relieve." He prescribes it in doses of three grains of the extract, or thirty drops of the tincture every half hour, hour, or two hours. The system is very tolerant of it, as of opium. The amount of testimony in its favor is large and increasing.

Iron is a remedy extolled by Elliotson, who had two cases recover while taking the sesquioxide in enormous quantities, *ad libitum*, and had eight others reported to him.

Belladonna, and, indeed, all other narcotics, have been employed freely, and eulogized. Tobacco alone does not seem to find in the system, in tetanus, any greater tolerance than under other circumstances. It relaxes profoundly, and is said to have proved promptly fatal.

Turpentine and cantharides have been used as revulsives to excite strangury. The former is also serviceable as a purgative, and by its intoxicating quality. I saw a protracted case, treated with it by a friend, recover slowly.

Chloroform, since its discovery, has been very extensively and freely resorted to. It will always relieve the present suffering more or less. Some allege that its ultimate influence is injurious; but this, I think, is not proved. I am strongly impressed with favorable views of its influence as an efficient palliative and anæsthetic; and must hope, too, that with it, we shall thus retard the progress of a case, and somewhat improve the chances of recovery.

A very heroic method of treatment was carried into execution in the neighborhood of Charleston by the late Dr. Ffirth, who, it is said, repeatedly found it effectual. It was a harsh moxibustion with the ordinary cautery. Pledgets of cotton, steeped in turpentine, were laid all along the spine on both sides, from the neck to the sacrum, and set fire to; after they had burnt away, the lines along which they had been arranged were still further seared by the hot iron. Pot hooks, as being of convenient shape, were employed for the purpose, in the only case I ever saw treated in this horrid way. The patient, a stout young fellow, died very soon after, whether from fright, or struggle, or the disease.

It is generally understood that tetanus proves fatal by exhaustion merely. To prevent this, stimulants were formerly administered in indefinite quantities. Wine and brandy may, in most cases, be taken *ad libitum*, like opium, without intoxication. But more recently, a still greater stress is laid upon the necessity of sustaining the strength by frequent supplies of nutritious food. Peet, whom I have already quoted and referred to, as more familiar with the disease than any other authority, takes occasion to say that he does not regard "any one course of treatment as better than another, except so far as it takes care to keep up the patient by proper feeding."

MYELITIS, *Spinitis*, *Spinal Meningitis*.—This is happily a disease of rare occurrence. It may present itself in the acute or chronic form. It is recognized by uneasiness at first, soon increasing into severe pain along the spine, which is intolerant of pressure generally, but especially at some point; there is fever, with quick frequent pulse; the patient cannot bear to be moved. After an uncertain time, there comes on opisthotonos, the head being drawn strongly backwards, with severe clonic spasms occasionally involving a greater or less portion of the muscular system; trismus sometimes, but I think not generally; the breathing is hurried and irregular, the countenance anxious, the spirits desponding; the tongue is furred and red, often with nausea. Death may ensue within a few days or a week, but the case is usually protracted, the patient sinking at last exhausted with suffering.

Autopsy shows engorgement of the medulla spinalis or its membranes, or of both; with effusion of serum or pus, subarachnoid; or infiltration and softening of the cord.

The *treatment*—which has not been generally successful—is by active depletion, general and local; mercurials and opium have been freely administered; relaxation and subdual of inflammation attempted by the antimonials, with nit. potassæ; cold applications are made at first, and afterwards counter-irritants of the severest character, even the actual cautery employed along the back.

In a case of chronic spinitis or myelitis which came at a late period under my care, ascribed, somewhat doubtfully, to a fall upon the rounded stones of a street pavement which hurt the vertebræ of the loins, there had supervened attacks of tetanoid spasm, at first few and distant, but increasing in frequency, abruptness and severity. They were irregular and at varying intervals, affecting sometimes one part of the body—one set of muscles, and sometimes another. There was never any trismus or lockjaw. The appetite, digestion, and general health held out for a surprising length of time, but at last yielded gradually, and the patient sunk worn out with his protracted agony. All efforts for his relief were tried in vain. Chloroform alone seemed to be of any service. He was aware usually of an approaching paroxysm, and eagerly resorted to its inhalation, thus relaxing the painful spasm.

CEREBRO-SPINAL MENINGITIS.—I know no preferable place to assign to a disease known by this title, which has of late years shown itself as a local epidemic in many separate districts of our country, of which several well-written monographs have appeared in our journals, and a valuable compendious history is given us by Dr. Condie in his recent editions of *Barlow's and Watson's Practice.*

It usually invades with a chill, succeeded by great febrile excitement, the headache being intense from the first with severe pain down the back, and in the limbs. The countenance, often flushed, expresses surprise or wildness and terror; there is vertigo; the pupils of the eyes are generally dilated; sometimes, however, they are contracted, and, it is affirmed, may be in opposite states, one dilated and the other contracted. The patient is very restless, moaning or uttering plaintive cries; the breathing, at first hurried, soon becomes slow and oppressed and even stertorous; the speech thick and inarticulate. After an uncertain, but brief period, tetanoid spasms come on, being readily excited; there is hyperæsthesia, with muscular rigidity. Opisthotonos is the usual form, but it is sometimes pleurosthotonos or emprosthotonos. Tympanitis and constipation are present, with palsy of the bladder and lower extremities. In the last stage there is coma; the tongue is dark and dry, with sordes on mouth and teeth; the bladder is distended with constant stillicidium of urine, and involuntary fecal discharges take place.

The *prognosis* is unfavorable, and the proportion of deaths large. Complication with erysipelas has been frequently met with, and greatly increases the mortality.

The *diagnosis* is said to be readily made by the tetanoid symptoms. The duration of the cases varies from 24 hours to six or seven days.

Autopsy exhibits lesions of the whole cerebro-spinal column. There is inflammation with thickening of the membranes, with deposit of a creamy pus between the arachnoid and pia mater; the brain is of pink color, with serum in the ventricles and exudation of pus and plasma at the base.

The *causes* of this unmanageable affection are obscure and ill-defined, seeming to affect numbers at once, or in quick succession. Young subjects are chiefly liable to attack.

The *treatment* is uncertain, and thus far attended with no very gratifying results. The lancet is freely used by some. Topical depletion is generally resorted to by cups and leeches, applied to the temples, back of the neck, and along the spine. The hair is cut away, and cold douches employed, or ice laid to the head. Active purgatives are advised. Antimonials are largely given to produce nausea and subdue the vascular excitement. Mercurials are by many pressed to quick ptyalism. If the case is protracted, blisters are put along the spine, and stimulants and nourishment freely administered. During convalescence, quinine and the iodide of iron are said to be required as tonics.

HYDROPHOBIA—(*Canine Rabies.*)

There are several diseases alleged to be derived by man from the lower animals. Smallpox is affirmed by an ingenious and erudite writer to have been inflicted on us by the camel. Vaccine, we know, comes from the cow, and glanders from the horse. We receive rabies from the dog, and, perhaps secondarily however, from the cat. The canine tribes, in all their variety, the common dog and the wolf especially, are subject to a well known and definite form of disease, in which their saliva becomes intensely poisonous. No such specific affection ever arises spontaneously in the human subject.

We do not know by any positive experience whether the disease is in man communicable from one to another person. Magendie and Breschet have proved that it can be conveyed from a man to a dog. They inoculated two dogs with the saliva of a man laboring under hydrophobia, one of whom went mad eight days after, and bit two other dogs, one of whom was again attacked twenty-four days after.

It has generally been believed that none but the canine and feline tribes excite the disease by their bite. Professor Flint tells us that he was informed at Alfort that the saliva of the sheep and the horse were innocuous; but "Youatt saw a groom attacked with hydrophobia in consequence of having caused an abrasion of his hand within the mouth of a mad horse, which he was physicking."

The usual mode of excitement of the disease is by a wound or laceration being made by the tooth of a rabid animal, into which his saliva finds its way. But several instances are on record where the poor creature has been caressing his master, and licking a portion of the surface cracked, ulcerated, or scratched. And Hertwig has proved that a portion of the salivary gland laid upon such surface, and inoculation with venous or arterial blood, are capable of communicating the infection. (See *Romberg*, vol. ii. p. 142.)

Symptoms.—The attack comes on in man almost invariably at first with an uneasiness in swallowing fluids, or a reluctance to attempt to drink. Thus the disease deserves, in the human subject, the significant name by which it is known; in the lower tribes it would not thus be correctly denoted, dogs being tormented with thirst, and drinking easily and freely. The peculiar difficulty of swallowing fluids is explained by Romberg, as by no means a dysphagia, but "an impediment presented to this function by a difficulty of breathing." The sensation is described as one of strangulation and suffocation, when they attempt to swallow. There is intense anxiety at every such effort expressed most forcibly in the countenance and manner, as well as by the words and conduct of the patient. All the muscles of the chest and arms are thrown into action; the shoulders are elevated as in asthma, and the inspiration is effected with sobbing. There is, says Romberg, "excess of reflex tension," so great that vehement spasm and convulsion result from every trifling irritation. The most characteristic symptom, however, is the connection between this excessive reflex tension and the exquisite hyperæsthesia of a portion of the cutaneous surface, the face especially, and the neck, the parts which blush, and which are supplied by the respiratory nerve. A puff of air; the motion of a fan; blowing gently with the lips, excite respiratory spasms and universal convulsions. Air and water, heaven's best blessings, the essential pabulum of life, are specially irritating, and are greatly dreaded. The suggestion of the presence and qualities of water, its undulation, its vague reflection of light, brought to the mind by a mirror, will arouse the same spasm. The attempt to swallow water, in whatever quantity, brings on a violent spasmodic dysphagia, with suffocating convulsion and laryngismus. Deglutition even of the saliva, or of a solid mixed with it, is attended with the same result in a later stage of the case. Bright and Youatt say that the attempt to breathe deeply will, in some, bring on the spasm. Cold water and air are worse than warm air and water in their effects.

From time to time spontaneous attacks of anxiety and strangulation come on; some of these, however, may be excited psychically, by memory or imagination of water. As the disease progresses, hyperæsthesia even of the lower limbs ensues to such a degree that the slightest touch will bring on shuddering and gasping for breath, as on plunging into a cold bath. "The hurry and excitement with which voluntary movements are executed are most peculiar. The muscles," says Parry, "appear to anticipate the determination of making a movement." This is shown by the sudden starting up, the rapid leap from the bed, the extreme haste in walking, the violent seizure of a vessel when offered, and the desperate haste to gulp a portion of its contents, the wild gesticulation and uncontrollable restlessness. The mind becomes violently excited, and disturbed by fear and horror; there is sleeplessness, or brief slumbers are broken by terrible dreams. The manner of speaking is loud and vehement. There is burning pain in the chest and epigastrium; the pulse is very frequent. There is costiveness, and the urine is scanty. The saliva is thick, frothy, and abundant; the patient spits all about him. In the midst of seeming maniacal fury, the consciousness is usually undisturbed, and attention easily drawn and fixed. Sometimes there is vomiting; sometimes priapism and satyriasis; sometimes trismus and opisthotonos. Death may occur from apoplexy or asphyxia during a violent convulsion, or take place quietly from extreme exhaustion. The patient sometimes drinks just before dying. Some few retain throughout these most appalling scenes of horror and dismay a strange kind and degree of self-possession; and warn their friends repeatedly and tenderly against their fierce violence.

I have seen two cases of hydrophobia. Of one of them I add the following brief description. Julius, a black boy, æt. three years, was taken ill on the 4th Feb. 1840, complaining of pain in his head and stomach. I saw him on the morning of the 5th. His skin was cool, his pulse very frequent, his lip slightly livid, his eye wild, his countenance anxious, his tongue natural; he sighed and sobbed frequently, complaining still of pain in his head and stomach, and nothing more. There was something peculiar in his manner of taking his medicine, a fluid, which excited attention and inquiry, and it was remembered that in September, more than four months previous, he had been bitten by a small dog. On the 6th, his pulse was frequent and feeble, there was incessant fear of a vague something, and anxious desire of change of place; the limbs were moved about much as in chorea, constantly and irregularly; the skin was cool, the lips very livid, the eye staring, and the pupil dilated so widely that the iris seemed a mere ring. I blew in his face, and was startled by the horrid spasm with which he was convulsed; indeed, I did not think he could survive it. A few drops of water, sprinkled upon his face, produced a similar effect. His breathing was now little more than a succession of sobs. He was dreadfully agitated at the approach of water, and refused to take any. He walked feebly and with a staggering step. A few hours after, he became thirsty, and would take water, throwing his arms about and grasping at it with frantic eagerness; notwithstanding the spasmodic state into which the attempt threw him, he would succeed in swallowing some of it. In fact, he now seemed more convulsed by blowing upon him, or sprinkling a few drops in his face, than by taking water into his mouth. Terror was strongly depicted in his countenance; his muscles were scarcely a moment at rest; he was extremely loquacious, asking for water, and complaining of headache. He died in the evening, having been ill about 48 hours.

The case is instructive from the age and condition of the subject. The phenomena were purely physical and unmixed with any imaginative conditions. I saw, some time afterwards, with a medical friend, Dr. Bellinger, another similar, in a boy, a white, of about ten years. The history of the symptoms was almost exactly identical with that above given.

The *duration* of the attack of hydrophobia is set down as between thirty-six and ninety-six hours; average three days. The *autopsy* reveals nothing characteristic. Romberg says, that putrescence is very rapid in the dead body, whence probably the emphysema and air found in the vessels, blood and brain. In the nervous system, the observations are negative; there is inflammation of nerves at the bitten part; but it does not extend. The blood is black and thin, and the inner surface of the large vessels dark. In the respiratory organs, the congestion is universal; there is engorgement of lungs and lobular emphysema; the tubes are full of frothy mucus.

The post-mortem examination of the case above detailed, showed the membranes of the brain much injected, but its substance natural. The lungs were little changed in appearance. There was subcutaneous inflammation well marked of the parts bitten. Nothing else was seen worthy of notice.

The *latent period* of this dreadful infection is absolutely undetermined. In dogs inoculated, it is within fifty days. It is pretended to limit it in the bitten human subject to between fifteen days and nine months. The average of sixty collected cases is between four and seven weeks. But there are cases on record which carry us very far beyond the above limit; and I know not why we should reject them.

It is interesting to estimate the proportion of attacks among those wounded by rabid animals. This differs greatly as stated by different observers. To what I have already said on this subject, p. 80, I will add that Hertwig found it little more than twenty-three per cent. in dogs, in whom the susceptibility seems greater than in any other animal. Fourteen were taken out of fifty-nine inoculated; some of them required more than one inoculation; one resisted nine inoculations in three years. Youatt found that two dogs were attacked of three bitten. Man is allowed by all writers to be in comparison, but slightly susceptible. Hunter tells us that of twenty-one persons bitten, none of them taking any precautions, only one was taken. Vaughan and others make similar statements. The bite of the mad wolf is esteemed more dangerous than that of the dog. Trolliet says, that of twenty-three bitten by a wolf, thirteen became rabid. The bite is of course less to be feared if made through clothing, than when upon the naked skin of face or hands.

Of the *treatment* little need be said. All die. We should avoid physical restraint as far as possible; it irritates, agitates, and renders frantic the poor sufferer, who should be surrounded with attendants numerous and strong enough to prevent his injuring himself or any one else. Chloroform is an invaluable palliative; I would employ it freely. There is great tolerance of opium. Babington gave 180 grains in eleven hours, with little or no effect. A long tube may sometimes be used for drinking with at least partial success; the vessel and fluid being neither seen nor spoken of.

The *prophyluxis* is of the greatest importance. All civilized communities should diminish the number of dogs among them by taxation so heavy, that none but animals of value will be retained; and these will be watched and taken care of.

The bite of every dog which has previously seemed to be in ill health should be regarded as a dangerous wound, and treated accordingly. I accord all faith to the diagnostics of canine rabies as described by the competent authorities in Germany, France, and England; but there are so many instances of hydrophobia after unsuspected wounds, that I would follow the general rule above laid down. Nay, farther; any bite given by a strange dog, whose condition cannot be known, or by a dog in a fit of fierceness unprovoked or unaccountable, should be subjected to definite and efficient precautionary management.

The hot iron, *actual cautery*, if the whole surface of the wound can be thoroughly burnt, is the method I prefer, and have followed in two instances. The subjects escaped without harm. Miller urges *excision*, complete excision, even to amputation if necessary. Youatt succeeded in 400 cases with the *nitrate of silver*. Great pains should be taken to make the application to the entire wounded surface. I will not attempt to decide between these three modes; I have no confidence in any other. The resort to one of them should be prompt and unrelenting.

Lastly, we treat briefly of the class of affections supposed to be seated in the nerves, and entitled—

NEURALGIA.

Hyperæsthesia of Romberg.

The philosophy of the nervous system is too obscure to admit of a clear understanding of its morbid conditions. The very language which we use in treating of its pathology, is vague and indefinite. Thus neuralgia is the term chosen to denote painful disorders of certain nerves, as if all pain were not essentially nervous; it is intended here, however, to exclude the idea of inflammation or structural lesion of the parts supplied by the diseased nerves, or their ultimate expansion. Under this head, I propose to consider, briefly, three varieties of morbid affection, closely allied in nature, and analogous in symptoms and results. 1. Spinal irritation. 2. Tic douloureux. 3. Visceral neuralgia.

[illegible] the term neuralgia to that used by Romberg. I have always considered disease as a state of perverted rather than of merely increased or diminished action or function. The term hyperæsthesia expresses clearly enough a plus state of excitability or susceptibility; but [illegible] the real condition. The sensory nerve does not merely act excessively in its physiological mode; it is pathologically affected, and the sensation is always painful. Romberg himself says that "hyperæsthesia of the cutaneous nerves is manifested by *pain* in its various modifications, that of the nerves of special sense by *phantasms*."

We occasionally observe, though rarely, that anæsthetics, so called, [illegible] ether especially, produce a condition analogically converse, in which the susceptibility to pain is taken away, but common sensibility left. I saw an intelligent patient etherized, and under the knife; he assured me that he was sensible of every step of the operation, yet that he suffered not the least pain. Professor Eve has published the account of an individual originally insusceptible of pain.

[illegible] lays down the following characters as applicable to the [illegible] neuralgias, properly so called: "1. Periodicity, the alternation of paroxysms and intermissions." Yet he not only admits but describes most graphically, some atypic cases, which he truly [illegible] terrible and unmanageable. 2. "Uniformity and persistence of the symptoms, however long the duration of the disease. 3. Absence of danger to life." I have known two patients, however, sink exhausted under the disease, and Halford speaks of apoplexy as the ordinary termination of facial neuralgia. 4. "Freedom of early life from the disease." It rarely appears before the fortieth year of life. It is not uncommon, I know, to meet with what are called "spinal cases," in young women, but the frequency of these has been prodigiously exaggerated, and hysteria, and a modified erotomania mistaken for it very often. These "extravagances," as he calls them, and "the deception practised upon the medical man," are very properly dwelt on by the author last quoted, but he carries his scepticism too far.

1. *Spinal irritation: Spinalgia.*—These may seem paradoxical terms, as used to designate a particular form of neuralgia, so-called. But the symptoms which constitute it manifest a somewhat diffused nervous affection, referable obscurely to the spinal cord, but unattended with either the convulsive disturbances or paralyses which are regarded as belonging to all its organic lesions.

It is an oppressive, annoying hyperæsthesia. The patient complains of constant uneasiness in the back and loins; is easily fatigued, indolent, unwilling to walk, or stand, or sit erect. There comes on aching along the course of the crural and sciatic nerves, with quick flashes of intensely acute pain perhaps, and a sense of weariness in the lower limbs.

If the irritation be seated high up, there may be added, neuralgic suffering of the upper extremities. This will follow usually the course of the ulnar nerve, darting along to the tips of the fingers, and recurring at almost every movement.

The general health yields under the influence of the persistent distress, want of exercise, and disturbed rest; and a long series ensues of sympathetic derangements, which terminate in hectic and atrophy; the digestive and genital systems suffering prominently.

The cause and nature of this spinal neuralgia are alike obscure.

It is not always easy to *diagnose* this affection from spinal arachnitis. In both there is tenderness on pressure; the latter is, however, apt to be associated with tetanic rigidity of muscles and febrile state of the system, which symptoms are wanting in neuralgia proper. I have I think observed, too, that the hyperæsthesia in the present case is superficial, and that if the pressure be continued a few minutes gently and carefully, it ceases to give pain; nay, in one case my patient declared that it produced, on the other hand, relief, and a pleasant sensation. The absence of febrile excitement in the early stages gives good ground for distinction. The disease is almost exclusively confined to females, though I have seen two examples of it in males pretty well marked.

The *treatment* of these chronic and tenacious affections is by no means an easy task. Mild applications, to any tender portion of the spine, are to be preferred. Moxibustion and vesicatories too often employed seem to me to do harm. Leeches, if the patient be not weak or anæmic, may be used prudently. Granville's lotion often gives relief. The metallic tonics are serviceable. I have exhibited the carb.

ferri in very large and persistent doses with advantage. When it failed me, I have employed successfully the nitr. argenti.

I have insisted upon passive exercise in the open air in the earliest intervals of comparative ease. Nothing has advanced the recovery of my patients so much; and it required no great exertion of fortitude to bear the little uneasiness it gave at first.

2. *Tic douloureux* is a painful affection of the extreme expansion of some external nerve. Good makes three species—faciei, pedis, mammæ—the first being most common. I have seen two instances of the second. The third is happily rare. Tic douloureux is paroxysmal, spontaneously recurrent—observing, though not very exactly, the law of periodicity; the pangs suffered during an attack are intense, and of singularly depressing character. Patients describe the morbid sensations sometimes as if a stream of fire had been transmitted through the nervous filaments, renewed again and again after a brief interval; at others as a dull aching, slowly increasing and extending until it becomes intolerable anguish, and then as slowly subsiding for awhile. I have seen a stout and intrepid man under this torture succumb and fall at last from his chair in a state of almost complete incapacity; with his eyes deeply reddened and protruding from their sockets, and his face flushed and turgid. Of all the nerves in the body, the fifth and seventh pairs seem to be most frequently affected.

The *cause* of tic douloureux is unknown. Some affirm its dependence upon a cachectic constitution or general impairment of habit; but I have met with it in robust and otherwise healthy individuals. Malaria has been assigned; but it is not more frequent in malarious countries than elsewhere, nor among individuals assailed by other malarious diseases. I saw it once in a clergyman affecting the calf of the leg violently, in whose case I ascribed it to a gouty diathesis, and treated him accordingly. Visiting England, he consulted Sir B. Brodie, who approved the course he was following; and said that he had met with several similar cases, which he regarded as gouty neuralgia.

The *treatment* has been various, and not flatteringly successful. Excision of a portion of the painful nerve has been performed with occasional benefit. The iodide of mercury, veratrine, aconitine, and morphine, have been employed by inunction and inoculation to produce a local anæsthesia. I would suggest the "Voltaic Narcotism" of Richardson with the two latter, as a hopeful means of relief.

Lombard, and after him Trousseau and Bonnet, apply the solution of cyanuret of potassium externally to the part affected as in cephalalgia.

The general effects of the application are curious. The pulse and respiration become slower, with a sensation of cold, not only locally, but over the whole body, with disposition to sleep.

The general management of the patient is of importance. For the most part the system requires to be sustained by tonics, of which the metallic salts are to be preferred. The valerianate of zinc seems often useful. The oxyde is also employed in doses too small to nauseate. The tris-nitrate of bismuth is exhibited largely, and supposed to exercise an obscure alterative influence as well as tonic. Those who ascribe it to malaria have pressed the use of the sulph. quinine, and with alleged benefit. Cinchona in infusion and tincture I think preferable, and alternate some preparation of the kind with the acetated tincture of iron.

Fowler's "Mineral Solution of Arsenic" is the favorite prescription of a great many practitioners.

Change of air and a visit to the warm sulphur springs of Buncombe or Virginia have been of great advantage.

3. *Visceral Neuralgia.*—This is also a paroxysmal and recurrent affection. The ganglionic system of nerves is the principal, though perhaps not the exclusive seat of suffering here, and the anguish of the wretched patient is indescribable. One of its most common forms is known as "nephritic colic," the kidney, lower intestines and testes being assailed with pains of most "atrocious" intensity. All the viscera may be similarly attacked. The dreadful sufferings of the dyspeptic are very often doubtless truly neuralgic. Enteralgia, indeed, connects itself prominently with many visceral disorders. Dysmenorrhœa is sometimes a mere uterine neuralgia. Many of the varieties of headache are in all likelihood of the same character; and thus also I regard some of the cardiac and diaphragmatic affections, so obscure, so irregular in their access and associations, and so full of pain and danger.

Treatment.—All forms of this disease are intractable and tenacious. We may generally relieve a paroxysm with the prompt and unhesitating administration of opium, or some of its preparations. The doses should be as large as the stomach will bear, and for quickness of effect, I prefer the solution, either of the drug entire, or of some of the salts of morphine. The warm bath will aid their action, and so it is asserted will the combination with them of camphor, musk and assafœtida. In the intervals, guaiacum and colchicum are advised by some, while others rely upon the tonics, selecting arsenic and iron. While there is any tenderness upon pressure locally, either of any portion of the spine (which we should never omit to examine carefully), or any other part of the body, cups or leeches should be applied there, and counter-irritation assiduously attempted by sinapisms, blisters, issues, and by the ammoniated lotion of Granville, which last I have found specially well adapted. For temporary relief we may have immediate recourse to chloroform; but it must be used with a degree of reserve.

These few rules apply generally to neuralgia wherever seated; but we must modify our treatment, and address it specially to the several organs affected. Gastralgia is to be managed as advised under the head of dyspepsia, of which it is doubtless the principal element. Of cephalalgia I have already spoken, and of angina pectoris. Dysmenorrhœa, or uterine neuralgia, is best treated by large doses of camphor, guaiac and opium, and other anæsthetics. Nephralgia is usually connected with some vitiation of the renal function, as shown in the presence of morbid urine, of urinary concretions or oxyluria. The proper remedies for these conditions—to be hereafter considered—must be promptly and assiduously resorted to, while immediate relief is sought from chloroform, opium, or some of the salts of morphine, the warm bath, warm and anodyne fomentations, and laxative and soothing enemata.

SECTION V.

DISEASES OF THE MOTORY SYSTEM.

THE apparatus of locomotion, consisting of bones, joints, ligaments, tendons, and muscles, is liable to partake in all the general disorders which affect the human constitution. In every form of disease, it suffers from debility; in fevers, it is tormented with universal malaise, and often with local pains of great severity. In some of the intestinal disorders, the muscles are pinched with agonizing cramps, and, as we have just seen, many of the derangements of the sensorial organs and functions manifest themselves by vehement spasm and horrid convulsion, as in tetanus and epilepsy.

We are now about to speak of the maladies which are almost, if not altogether, fixed in the motory apparatus: Gout, the proper seat of which is in the smaller joints, extends itself to the larger very often, and in an anomalous way to other portions of the body; and Rheumatism, which seizes upon the larger joints, but may affect them all. The white fibrous tissue throughout the body is more especially liable to be attacked by it, but the muscles often suffer; and, indeed, we can hardly say that any portion of the organism is exempt from its invasion. And first of

GOUT.

Gout—Podagra—Arthritis.—We have to consider gout, like scrofula, in a twofold point of view. It constitutes or depends upon a peculiar diathesis, of which its several local developments are the external manifestations. Regular attacks of gout, however, affect the joints exclusively, whence the propriety of the term arthritis, and the arrangement of it here.

The gouty diathesis or constitution may be transmitted hereditarily, determining a predisposition to its local manifestations so strong that they cannot be escaped, the subject being attacked in childhood or early youth. In the generation of the diathesis, full or luxurious living is the most influential agent; this is much aided by habits of indolence and refinement. Climate has probably some effect in inducing this state of the system, as in Great Britain, where gout prevails almost as extensively among the upper classes as scrofula among the lower.

The nature of this predisposition is not at all understood. It is usually connected with a plethoric habit, and a proverbial exemption from other forms of diseases is affirmed of its subjects.

The exciting *causes* which tend to develop it and give rise to an arthritic paroxysm are numerous and diversified. Intemperance, nay, a temperate use of spirits, even a single glass of wine, will occasion it in the predisposed—so will any indigestible or stimulating food, fatigue, loss of sleep. Local injury of a joint, as a twist or strain of the ankle, will sometimes be followed by a fit of gout.

Gout is divided into entonic and atonic—regular, misplaced, and retrocedent. It is *entonic* when the local inflammation is attended with febrile excitement, or increased force of vascular action. It is *atonic*, when the pulse and strength are below the usual standard—when, instead of febrile excitement and local pain, we have general disturbance and uneasiness, with little inflammation of joint or limb.

Regular gout attacks a joint, and is there fixed, the constitutional disorder being proportional to the local affection, and disappearing as it abates. *Retrocedent* gout is described as consisting in a metastasis of such local affections, from the joint first attacked to some one of the internal organs. *Misplaced* gout is said to occur when, at or about the usual period of the recurrence of a paroxysm, or under the influence of the causes which tend to produce it, an arthritic subject becomes affected with varied internal disorder.

The *pathology* of gout is confessedly obscure and uncertain. The nature of the diathesis, especially when hereditarily derived, is utterly unknown. The local inflammation is of peculiar character, and terminates only in resolution or deposition of earthy matter, never in effusion of pus, or serum, or in gangrene. The humoralism of the present day ascribes all the phenomena to the presence of an undue proportion of uric or lithic acid in the blood. But, if the identity of the lithic with the gouty diathesis be established, it still remains to explain or account for the production of the acid in undue amount.

The *diagnosis* of gout is easy in cases of long standing; a first fit may be taken for rheumatism. It may be distinguished by its intensity and its peculiar preference of the smaller joints, very generally the ball of the great toe, in its early invasions, whence its title podagra.

The *prognosis* in regular entonic gout is decidedly favorable.

In atonic irregular attacks, it is the reverse; these are often suddenly fatal, whether the stomach, the heart, or the brain, be the part affected.

A *paroxysm* of regular gout begins with a swelling of the ball of the great toe, which is extremely tender to the touch, with much tension and glossy redness of the skin, the veins being full, and the arteries throbbing. The pain, which is insupportably severe, extends upward towards the ankle and calf of the leg, and is much increased by letting the foot hang. Motion is impossible. There is fever, with headache and uneasiness of stomach; the pain is described as very distinct and peculiar, and attended with a sense of numbness and paralysis of the part. The inflammation occasionally changes from one foot to the other, or extends to the knee. After the duration of a few days, these symptoms subside, leaving the patient in good health. At first, the intervals are long. Repetition increases the duration of the paroxysms, and multiplies the seats of attack, including the fingers, knuckles, knees, &c., until the local inflammation becomes almost permanent, when we may have the deposition of urate of soda and phosphate of lime, so characteristic of gout.

The symptoms of retrocedent or misplaced gout depend upon the organ invaded. When the viscera of the thorax and abdomen are affected, there appear the usual signs of gastritis, enteritis, pneumonia, etc. When the brain is the seat of evil, it assumes rather the form of apoplexy than phrenitis; and when the heart is assailed, there are present the symptoms of angina pectoris, the case being more correctly a cardiac neuralgia than of inflammatory character.

When with these arthritic affections there coexists an infirm, debilitated condition of the patient—atonic gout—the pulse is feeble and wavering, the skin cold and clammy, the pain intolerably oppressive, and described as spasmodic, with constriction of the chest or stomach. When these pains are transitory, though severe, and shift from place to place, now assailing one organ or part, and now another, now the trunk, and now the limbs, it is the "flying gout" of the books.

Treatment.—During the paroxysm, in young and robust subjects, and in the earlier attacks, it may be proper to resort to venesection, but very rarely; and certainly not in the opposite class of cases. Purgatives are almost always useful and necessary. I prefer a combination of a resinous with a saline, adding some aromatic. Emetics are very seldom indicated; I would employ them when the stomach was loaded with a recent full meal, at the commencement of a fit. Opiates are much objected to by some, but, in all prolonged paroxysms, I am in the habit of prescribing the Dover's powder freely at night, and with excellent benefit.

Colchicum is by many regarded as a specific here. It is beyond question one of our most useful and available remedies, though somewhat uncertain in its effect. We learn from the most competent living authority on this subject, Prof. Dunglison, that the vinum colchici, as made from the fresh root, is the best preparation of the article.

The instructive experiments of Dr. Wm. Hammond, U. S. A., show that the action of colchicum upon the urinary excretion is very remarkable; exclusively occasioning a decided increase in the amount of solid matter thus eliminated, both organic and inorganic.

Husson's "Eau Medicinale," supposed to be a similar preparation of colchicum, is much used by gouty persons. "Wilson's Tincture," another secret remedy, perhaps a compound of colchicum and veratrum, will often control and arrest the fit of invading gout. All these act sometimes harshly upon the bowels, and must be watched.

During the intervals between paroxysms, the patient may be, or seem to be, in peculiarly good health. Hence arose the long-prevalent idea that a fit of gout was protective, and, in a certain sense, salutary to the constitution. Hence, also, the expectant treatment of gout, which was trusted to "patience and flannel." But it is not always so. Many arthritics continue to be tormented with symptoms which, when taken together, constitute *chronic gout*, as some have called it. This is most graphically described by a scientific sufferer, Prof. Dunglison. "Disorders of every kind of the digestive function prevail, the rest is disturbed, the heart's action is irregular, with violent palpitation and pulsation of the abdominal aorta; interruption of the pulse, with cough; pain and uneasiness in the rectum, with piles and hemorrhage. The urine generally deposits the lithates or lithic acid, and phosphatic depositions not unfrequently take place. The encephalic functions suffer more or less; deterioration of temper, giddiness, and depravations of vision, as muscæ volitantes, &c., attend."

The depositions above mentioned are not met with as often now as formerly. They are called chalk-stones, and form chiefly in the hands and feet, crippling the patient sadly.

"Perhaps," says old Chalmers, writing nearly one hundred years ago, "perhaps the gout attacks more people for the number in Charles Town, and certainly returns oftener, than in any other place." Thus says tradition, too; but whether the climate or manners have changed so as efficiently to alter the predisposition, it is perfectly well known that the statement will not apply now. Gout is a rare disease there, and has become less and less frequent within my own observation. Nor does it attack very often or very seriously the few subjects of it still to be met with. The climate appears to be much the same. The amount of acid ingesta is probably somewhat less, as oranges are now imported, which formerly grew there. Very large use is still made of acids, to which Chambers and others ascribed principally the prevalence of the gouty diathesis. There is, however, a very notable change in our American habits, which may have some effect. We drink far less wine than formerly, and the fiery punch, a favorite beverage of our forefathers, is now almost obsolete. We have substituted lemonade and sherbets, in great measure.

In the chronic gout—arthritis larvata, the cases of which continue to be spoken of doubtfully, and, in those examples of disease supposed to be of hybrid or mingled character, which even Fuller speaks of as "rheumatic gout," we should resort to alkalines with colchicum, to remove from the blood the essential morbid poison—the excess of uric acid—upon the presence of which gout essentially depends, and perhaps rheumatism also.

In the local management of the gouty joints, leeches are generally serviceable; they diminish the pain, if they do not shorten the paroxysm. Some patients are relieved by a soft, tepid poultice, while others derive comfort from cold, astringent applications, as the solution of acetate of lead, sulph. zinci, etc. I have not seen the good effects promised from opiate frictions and blisterings. Percussion and bandaging are recommended by Balfour and others, but my patients cannot bear the part thus handled. With regard to the cold bath, so much a subject of dispute, I would resort to it, if in a young and robust patient, after proper depletion, the pain and inflammation are obstinately prolonged. Under other circumstances, I would consider it unsafe, and dread its giving rise to retrocedent or metastatic gout.

During the interval, temperance and exercise are the best prophylactics. The diet should be nourishing, but unstimulating. A threatened attack should be opposed by laxatives and tonics. The tinct. guaiac. combines these qualities; I have seen it often serviceable. The alkalies and bitters have enjoyed a high repute, but since the Portland powder lost its reputation, are not as much used as formerly.

The *irregular* forms of gout, the *misplaced* and *retrocedent*, must be treated on general principles. If *entonic*, or if the local affections are properly inflammatory, they may require the prompt and free employment of the lancet, leeches or cups, purgatives, and blisters, to or near the parts assailed. If *atonic*, or neuropathic, on the other hand, an immediate resort to opium and stimulants is necessary. The tinct. opii may be given in large quantities with ether, chloroform, and other anæsthetics, and diffusible stimuli, while we apply the quickest revulsives to relieve the organ affected—mustard, hot turpentine, moxa, etc.

However confidently the diagnosis of gout is established, and its nature illustrated by the chemical investigations of Garrod and others, I fear that we have derived from them not much aid in the treatment. The prevalence of an acid acrimony in the fluids was long since assumed and dwelt on as affording suggestions for a rational practice. Alkalies have formed the basis of the chronic management of the disease for a great while, but it has not seemed to me that the success of the course has been satisfactory. My patients all prefer the empirical treatment by the vin. colchici, by "Wilson's tincture," or the "Eau d'Husson;" and, for myself, I must say that I place on them as much reliance as on any of the numerous remedies which have been lauded so highly, and with all of which I have experimented carefully, assiduously, and conscientiously.

RHEUMATISM.

This disease is especially interesting to physicians from the frequency of its occurrence, the intensity of suffering which it often causes, and the certainty with which, in the majority of cases, these sufferings may be relieved by proper management.

Rheumatism is usually divided into acute, subacute, and chronic. The elements which constitute it vary in prominence. In the first the inflammatory, in the last the neurotic symptoms prevail; in the second they are mingled more equally.

1. *Acute rheumatism* presents violent local affection, some part being red, swollen, and painful; the larger joints, muscular and tendinous structures, are attacked; the suffering is great. Fever runs high, with marked nocturnal exacerbations. The blood is buffy, and cupped, and fibrinous; the sweat is disagreeably acid; the urine highly acid, containing, says Jones, "crystals of oxalate of lime;" the skin of the parts inflamed is very red. Suppuration is rare; I have seen it occur twice in the same subject.

Rheumatic inflammation is of an exceedingly vagabond character, leaving its first seat and showing itself in another, the first being greatly relieved, but not absolutely free; and thus it may, in a few days, traverse or extend itself over the whole body. The so-called metastasis to the heart is chiefly to be dreaded; but it is far less frequent in my sphere of observation than the books generally represent it. Nor must we omit to remark that this cardiac affection, connected with rheumatism, or truly rheumatic, is occasionally the first symptom presenting itself, the disease, as we learn from good authority, selecting this great central organ as its point of invasion.

The *prognosis* is favorable generally; the duration of the attack is variously stated. I would estimate it at from seven to fourteen days.

2. *Subacute rheumatism*—the most common form, is not usually marked by chill or vehement constitutional disorder. Fever attends, however, most pronounced at night. The local inflammation and pain, often severe, may shift from place to place.

The *prognosis* is favorable. The duration is not very definite. Relapses are frequent. Suppuration is rare. Deformity and impairment of motion of limb and joint are occasionally left. The heart, as in the acute form, may suffer from organic changes consequent upon its inflammation, whether metastatic or inclusive.

3. *Chronic rheumatism* is an obscure and varying malady. There may not be much pain in the joints, but they are swollen and deformed, and become anchylosed; they sometimes suffer intensely; the muscles become imbecile and atrophied; the heads of the bones enlarged, and hardened or softened; there may or may not be fever; an exacerbation may generally be noted at night.

Prognosis unfavorable. Duration protracted. Recovery not often perfect. Relapses frequent.

The predisposing *causes* are not well known, although it is evident that certain persons are more susceptible of seizure than others. One attack renders the subject more liable to a second.

The exciting or occasional causes are more obvious. Sudden alternations of temperature, and exposure to cold and moisture are the chief. A partial exposure will sometimes produce a local rheumatism, as in the familiar instance of stiff-neck, from sitting near a partially opened window or door. Ozonic influences have been suggested.

The *diagnosis* of rheumatism is usually easy. It is not liable to be mistaken for any other disease than gout, the characteristics of which are well marked.

Acute rheumatism usually affects young adults, and middle-aged persons. I have seen it, however, exquisitely developed in a child of three years, and in some old people. Both sexes seem equally liable to it.

Chronic rheumatism usually attacks persons in advanced years and of otherwise impaired constitutions.

Treatment of the two first forms of rheumatism, the acute and subacute.—In the young and robust, it may be requisite to employ the lancet, but this instrument has been used with great imprudence by many, in the hope to extinguish the disease at once. A certain degree of caution is necessary, or injury will ensue; and, although it is undoubtedly proper to relieve hyperæmia in the plethoric, and to reduce vascular excitement, which occasionally runs high, by bloodletting; yet it should be remembered that there is something peculiar in the nature of the inflammatory affection which refuses to yield to mere detraction of blood, and that this remedial measure, when carried too far, has changed a transient or acute into an obstinate chronic or passive rheumatism. Bouillaud, who bleeds most freely, reports a very large proportion of metastases to the heart, and does not promise any prompter relief than Hope and Latham, who rely chiefly on opium and calomel. Purgatives are undoubtedly useful. I employ the saline alone, in the first stages; as the case progresses, in combination with diaphoretics; and sometimes substitute the resinous with calomel. Diaphoretics, indeed, have been regarded as specifically adapted to the management of rheumatism. The antimonials are much prescribed and urged by some to a marked degree of sedative influence. Colchicum is highly recommended here, as in gout. It is said to combine, when given in proper doses, a purgative with a diaphoretic effect, and is greatly depended on by many practitioners. I make much use of serpentaria, at first with enough of the Epsom salt, in solution, to operate freely upon the bowels; afterwards with some form of opiate. The Dover's powder is invaluably beneficial when the earlier violence of excitement has been subdued by the lancet and cathartics, and in large doses will often remove promptly all traces of the disease. In protracted cases, the acetate of ammonia, with camphor and opium, will be found highly efficacious; sulphur is also regarded as well adapted to relieve old and habitual subjects of the disease.

In combination with any of these, except the antimonials, we may frequently administer infus. cinchonæ with striking advantage. Briquet substitutes for it the sulph. quinine, which he employs very freely, from five grains upwards, at a dose. I do not know on what principle these amounts of quinine are proposed, but they have been extensively exhibited, and their results favorably reported on by many physicians.

Dr. Basham, finding the blood strongly hyperfibrinated, and deficient, as is alleged, in its normal proportion of salts, was led to experiment with the nitrate of potash, in large quantities, and eulogizes it as specifically indicated, and particularly serviceable. These statements have been confirmed and repeated, and the medicine pressed very far; from ʒx to ℥ij, have been administered daily, in certain cases. I have not succeeded with it. Before I could reach the necessary dose, it was very apt to disturb my patient's stomach with nausea, and irritate both the intestines and the urinary apparatus.

I am not aware of the reasonings on which the exhibition of lemon juice was originally advised. Rees, Addison, and Babington have carried its employment to a great extent, giving from three to six ounces, three times a day, in the common confectioner's preparation. Dr. Peltier, of Montreal, speaks in the highest terms of the lemon-juice as "the remedy which has given him most satisfaction in the treatment of genuine acute rheumatism."

Babington tells us of a case in which half a pint was resolutely taken three times a day by a gentleman, who got well in three days. He considered it specifically adapted to the cure of acute rheumatism, which it puts an end to more speedily than any other remedy. Besides the above termination in three days, he records others in five, in eight, and in nine days. Dr. Golding Bird supposes it to act by virtue of the supercitrate of potass, which it contains. Dr. Pepper, of Philadelphia, who writes favorably of the lemon-juice treatment (see *Trans. Coll. Phys. Phil.*, vol. i.), argues that it is idle to ascribe its effect to the small amount of potass, and that it acts as a sedative, reducing the pulse; but that this does not fully explain its good influence, which is probably chemical. I think well of it, but have not been able to use it as freely as the books recommend; it has always brought on, in my patients, diarrhœa and colic, even when guarded with opium. One rheumatic within my acquaintance has acquired the habit of resorting to it early, on the recurrence of his attacks; and is fully persuaded of its power of arresting and preventing them.

Prout, and after him Bird and Fuller, regard rheumatism as entirely a humoral disease, depending upon a morbid poison diffused through the system, and hold that the materies morbi is the lactic acid. It is supposed to be "generated in the body, as the product of a peculiar form of mal-assimilation, of vicious metamorphic action. This poison it is, which, mingled in the blood, excites the fever, and produces all the pains and local inflammations, that are found associated in an attack of rheumatism." The treatment suggested by these views has of late prevailed widely. Fuller maintains that this acid materies morbi may be neutralized, its irritative properties probably diminished, and its elimination promoted by a free exhibition of alkalies and neutral salts. He believes in the unessentiality of the relation between the local inflammation and the constitutional symptoms, and holds that "if the rheumatic virus be present in small quantities only, it may cause little more than wandering pains in the limbs; if in larger quantities, it will cause febrile disturbance and excite inflammation." He quotes Graves and Taylor as recognizing rheumatic fevers, in which, "from beginning to end, not a joint was inflamed," p. 37. His course of treatment is made up of the alkalies and neutral salts, with colchicum, calomel, and opium. Sometimes a little antimony is added, sometimes the aid of purgatives is had recourse to, and occasionally, though rarely, he deems it expedient to premise a moderate bloodletting. If the skin is hot and dry, he "stimulates it to action, by the vapor or hot-air bath." It is the potassio-tartrate of soda which he prescribes as alkaline, being specially well tolerated by the stomach. By these means he reduces the duration of the disease, which, under ordinary management, he calculates at the average of between thirty and forty days, down to ten days or a fortnight. His plan of practice is really a very excellent one, whatever we may think of his pathology. I lay more stress upon opium, which, with an alkali, some purgative, calomel at first, and colchicum or guaiac, constitutes my dependence. I am glad now and then to avail myself of the admirable influences of chloroform, when the patient is required to move either for change of dress or the operation of the purgative. The amount of opium which I prescribe is limited only by the effect. I always carry it to the extent of giving decided relief to pain. Dr. Bird uses the alkalies as corrective of an acid diathesis, and as depurative diuretics. In this double view he regards the acetate of potass as unequalled, and exhibits it in large quantities, very freely diluted.

Piedagnel has introduced veratria as a remedy for acute rheumatism, in Paris, and asserts that it is cured thus in seven or eight days. Trousseau confirms his statement. They administer it in pills, each containing $\frac{1}{13}$ to $\frac{1}{10}$ of a grain. One is taken on the first day, two on the second, three on the third. It is rarely necessary to give more than seven pills. To this list of specifics for rheumatism, I will only add cod-liver oil, employed first by Percival, of Manchester, seventy-five years ago.

The *local management* of rheumatism deserves attention. Leeches or cups should be applied to the inflamed parts, and the flow of blood kept up by warm fomentations or soft poultices, which will relax and relieve irritation and tension; at a later stage of the attack sinapisms may be applied, and embrocations of a volatile or stimulating nature be made use of. The vapor bath is serviceable. There is some risk in the use of cold applications in the acute forms. The diseased action is already dangerously vagabond; its safest locality is in a joint or limb. Yet the wet towel bandage often gives great relief.

3. *Chronic rheumatism* is a state of disease difficult to describe. It may be the result of an intractable attack of the acute malady. There is a subsidence of fever and of general excitement; the appetite and strength of the patient are in a great measure restored, and the appearances of local inflammation diminish and disappear, with the exception of the swelling, which continues, and may increase irregularly, the joint being incapable of motion and unsymmetrical. In general, there is no great acuteness of pain, but the part is ill at ease, and some cases are attended with excruciating sufferings, which no lapse of time subdues; and in others fever persists, of the low irritative type. The muscles which move the affected limb emaciate, the joints become large, hard, stiff, and misshapen, with a pale and waxen hue of the skin covering them. Chronic rheumatism, when not the consequence of the acute form, is said to select usually women and feeble men; but the most remarkable instance of it which I have ever met with was in a stout and robust man, a physician, in the prime of life, healthy and athletic. The case is worthy of description, as exhibiting very strongly the characteristic peculiarities which mark the disease. The subject of it was sent for on a warm night in autumn to see a patient some miles from home. He rode hastily thither, prescribed, and then, bathed in perspiration, lay down to sleep under a window, in a strong current of air. On awaking he found himself incapable of moving without severe distress, every limb and joint being stiff and sore. A brother practitioner being called, bled him 40 ounces, after which time he had no pain. He was still unable to move, and in a few hours after was bled 20 ounces more. He never recovered the use of his hands, but was able to walk slowly and feebly. His joints were swollen, pale, and stiff—he emaciated gradually—his fingers were slightly bent, and had the appearance of waxen preparations. His appetite and digestion

were good, and there were no obvious febrile exacerbations, though his nights were often restless and uncomfortable. In this state of helplessness he remained for some years, with a clear intellect and a cheerful spirit. Having removed to a distance, I know not the manner of his death.

Lumbago and *sciatica* are two forms of chronic rheumatism well known and of frequent occurrence in the aged. In these affections of the hips and loins, there is usually much pain and incapacity for motion, but with little fever or general disorder. Some have doubted whether they are correctly to be considered as rheumatic, and have regarded them as neuralgic affections of the large nervous trunks, but it is difficult, if not impossible, to draw always such lines of distinction as are here aimed at; for many cases of painful affection of distant joints, with swelling, readily recognized as chronic rheumatism of ordinary character, are connected with and seem dependent on affections of the nervous trunks, and are relieved by cupping or leeching the part of the spine whence they arise.

Treatment.—In chronic rheumatism I would advise an avoidance of the lancet. The stimulating diaphoretics are our best remedies—guaiacum, camphor, ammonia and opium. Stimulants alone are much employed, and sometimes with good effect. The tinct. cantharid., turpentine, savin, and balsam copaiba are strongly eulogized. Sulphur is often beneficial, and in feeble subjects may be well combined with infus. cinchon. and serpentaria. The colchicum autumnale is supposed to be well adapted here, also. The phytolacca decandra is thought to be similarly useful. The Lisbon diet drink is a formula much employed; and combines several of our best diaphoretics. Experiments have been successfully made with the prussic acid in some very obstinate cases. The cod-liver oil is supposed by many practitioners to be specially well adapted here. The iodide of potassium has also its eulogists.

Endermic medication by vapor baths, fumigations of sulphurous acid, chlorine, phosphorus, ether, has been much in vogue. The natural hot baths have effected many cures in our own country; the springs of mountainous Virginia and of Buncombe in North Carolina, are much resorted to, and hot and sulphurous waters are drank with remarkable benefit by some patients, and with a degree of alleviation, I think, by a great majority, if not all.

Local applications have not been neglected, and the number and variety of those recommended at different times and by different persons for the cure of this very obstinate disease, are great. Leeches and cups are used occasionally with striking advantage. To Prof. J. K. Mitchell, of Jeff. Coll., Philada., we owe the suggestion to select the spine as the place of application—at the part whence arise the nerves supplying the points affected. Nor is the utility of this local depletion and revulsion, though as a remedy, somewhat uncertain and seemingly capricious, confined exclusively to the chronic form of rheumatism. In attacks both acute and subacute, a careful examination of the back will sometimes detect a spot sensitive to pressure, which will indicate the point of proper application. When thus guided we shall rarely fail to procure, by this means, more or less relief for our patient. Epispastics, the pustular irritation of tart. antimon., moxibustion, the persevering employment of strong friction over, and forcible flexion of the stiff articulations, have all restored patients. Acupuncture has often given immediate ease, and so have electricity and galvanism. The application of cod-liver oil, holding iodine in solution, has been highly recommended. The local employment of chloroform is found productive of great relief in chronic rheumatism, and especially in lumbago and sciatica.

The diet during the protracted existence of chronic inflammation should be generous and nourishing. Motion of the stiffened limb should be resolutely and frequently attempted. If there be any obvious susceptibility to cold, it will be a useful precaution to envelop in wool the trunk and limbs; or even to apply to the latter the caoutchouc, or the flannel roller bandage. Friction and percussion, and the cold douche have been useful, and should be experimented with.

The association of rheumatism with cardiac affections, is much dwelt on by writers generally, and especially those of England and France. When treating of the diseases of the heart, I stated that it had been my good fortune to meet with these sequelæ, metastases, or extensions of rheumatic inflammation, very seldom in my own practice. I am glad to find this statement, elsewhere published long ago, in accordance with the experience of the distinguished professor of practice in the University of Pennsylvania. I know not how to account for this striking difference in the history of European and American rheumatism. There is no very great contrast in the treatment resorted to. We do not generally imitate the ultra venesection of Bouillaud, but the course followed throughout our country resembles, not distantly, the practice of Latham and of Watson, who have said that "pericarditis is no more to be looked for when the disease is severe, than when it is mild," which is indeed almost equivalent to saying that it is always to be looked for. Fuller, too, declares that "inflammation of the heart imparts to rheumatism its chief danger and perplexity. Does the patient die during the first violence of the attack? His death is almost invariably attributable to inflammation of this organ. Does he apparently swoon? At no distant period, alas! he is taught there is in store for him a frightful amount of suffering, asthma, palpitation and dropsy as the result of his former cardiac affection." He maintains, however, that there is a great contrast in liability to heart disease in the severe acute and in the milder subacute cases. I am thus led to the belief that the ordinary attacks of rheumatism on this continent are of less intensity than those of which these much respected writers treat. I am sure it is the fact in the genial climate of the South. From Prof. Wood's statements I infer that it must be so also in the more northern locality of Philadelphia.

As far as anything in the medical treatment can suggest an explanation of the difference under discussion, I am disposed to refer to the larger and freer use of opium. Not to enumerate the long list of weighty authorities in its favor, I will quote from Fuller himself, who says: "I am satisfied that in many instances it has materially hastened the period of convalescence, and has lessened the frequency of inflammation of the heart."—P. 83.

In a malady rather neuropathic than inflammatory, though consisting of both elements; rather irritative than humoral, as I conceive; our most indispensable narcotic and anæsthetic is worth all other remedies put together; although much more beneficial and salutary in its curative influences when aided by a proper selection among them

SECTION VI.

DISEASES OF THE EXCERNENT SYSTEM.

Of all the classes of the physiological nosologists, this has been found most difficult to delineate and circumscribe. The business of excretion seems to be divided among many of the organs, which assist incidentally in its performance, while engaged in other functions. Thus the lungs, the liver, and the intestines, throw off much effete matter, while busied in digestion, absorption, and assimilation. The *Kidneys* are, perhaps, the only organs exclusively excretory; we know of no other function in which they are employed than mere elimination. Next to them, the *Skin*, perhaps, deserves to be considered in this point of view. Excretion is the most important office of the cutaneous integument, although by no means the only one.

I shall first treat of a few of the more important and familiar disorders which affect this extended *surface:* neither space nor opportunity permitting a more comprehensive discussion.

Among the chief of the maladies in which the skin is especially implicated, are the EXANTHEMATA, or *eruptive fevers*, a group of diseases, so called, from the fact, that a cutaneous eruption, preceded or attended by fever, forms the prominent point in their history.

The characteristic peculiarities of the *Exanthemata* are the following: 1. They are Pyrectic or febrile: 2. Eruptive: the skin is affected by a special form of inflammation: 3. Self-limiting: they come to an end at a defined period: 4. Contagious: 5. Self-protective: they do not attack a second time. Variola, rubeola, scarlatina, exhibit all these properties; pestis, urticaria, varicella, dengue, erysipelas, pemphigus, are not proved to be self-protective nor self-limiting. Analogies are pointed out which dispose certain writers of authority to class among the exanthems, typhus (Perry), cholera (Horner), pertussis (Watt). These are contended to be self-protective, contagious, febrile, eruptive: the mucous membrane being the seat of the eruption. They are not self-limiting in the strict sense.

Vaccine has its own exclusive history: but like glanders and hydrophobia, it does not belong to the list of human maladies; being introduced from the lower animals.

The most familiar of the exanthems combine many circumstances of close analogy. A certain febrile disorder, with notable gastric derangement, precedes, by a pretty regular interval, a specific cutaneous eruption of definite character. The period at which this characteristic eruption makes its appearance, though subject to occasional and slight modifications, is well known; it is transient in its duration, running a limited course, and then declining and passing away. Smallpox throws forth its eruption on the third day from the invasion of the disease, arrives at its height on the tenth, and then declines. The rubeolous eruption appears on the fourth, and declines from the seventh. Scarlatina shows itself on the surface on the second, and fades from the fifth.

They are contagious always, and often become epidemic also. They affect the human constitution but once; a rule which, however, is proved to be subject to occasional exceptions.

In the instance of smallpox and measles, the gastric disorder is notably diminished as soon as the eruption has appeared upon the skin; in scarlatina this relief is less observable.

The *pathology* of the exanthemata is specially obscure, although there is no want of theory or hypothesis on the subject.

The whole mass of fluids seems to be in some manner vitiated in these eruptive fevers; of which the best proof is found in the fact, that they are conveyed to the fœtus in utero, when the pregnant mother is attacked. Such instances happen not unfrequently in variola, and, although more rarely, in measles also.

VARIOLA—(*Smallpox.*)

A well known, contagious, eruptive, inflammatory disease. It has been supposed to be indistinctly mentioned in ancient writings, as prevailing among the easterns, but we have no definite description of it until the sixth century.

Smallpox is usually treated of under the separate heads of *distinct* and *confluent;* which terms, however, refer not to any specific difference, but merely to the degrees of violence of the attack, with the amount and extent of the attendant eruption.

Variola commences, like other inflammatory fevers, with a rigor or shivering, followed by heat, pains in the head, back, and limbs, gastric oppression, nausea, and often vomiting, restlessness, anxiety, and muscular debility. Sometimes there is a soreness of the throat, with pain in the side and chest, cough and dyspnœa. In young children the invasion is not unfrequently marked by convulsions. These symptoms continue for two or three days; from 48 to 72 hours, when, it may be a little sooner or later, the skin of the face and breast exhibits an eruption, consisting of small papulæ, slightly projecting, and of red color, which afterwards spreads over the arms, and the rest of the surface. From the time of its appearance, the febrile symptoms decline, and, in a great measure, subside. These pimples, or papulæ, assume in a day or two the vesicular form, becoming distended with a thin serous fluid; they increase in number and size, and on or about the seventh and eighth are of a circular shape, with a depression in the centre of the great majority. The contained fluid soon becomes turbid and purulent. In proportion as these pustules abound, the case is distinct or confluent. In the latter form of smallpox, they often run

, so as to make a complete mask for the face, and on certain
the body, those, for instance, which lie always in contact with
, run into large patches and crusts. Where they are not in
, the skin between and around them is inflamed, red and ele-
There is ophthalmia, and the face and eyelids are swollen, the
and throat are sore, and the patient spits largely a tenacious
About the eleventh day, there is an abatement of the inflam-
, both pustular and cutaneous. The pustules, or many of them,
and the contained fluid oozes out; they flatten, and by the four-
have begun to dry and condense into a hard crust. From the
eth, these crusts fall off, leaving, in a great majority of cases, a
nent depression or pit in the skin.

case may thus terminate, without farther danger or inconveni-
nd such is the history of a or distinct attack; but when
ustules are very numerous onfluent, we may have them
ding over and destroying the eye, extending into the throat and
a, occasioning suffocation or severe pulmonary inflammation;
such instances, a secondary fever arises, depending, probably,
e great degree of constitutional irritation, occasioned by so exten-
and violent an inflammation of the mucous and cutaneous surfaces.
secondary fever invades at variable periods, from the eighth to
eventh day. The tongue and mouth become dry; the pulse is
frequent and rather tense, but oft n feeble; the breathing is diffi-
drowsiness comes on, increasing into coma, and the patient sinks
sted with intolerable sufferings.

prognosis is favorable in distinct smallpox; in the confluent form it is the reverse. Bad cases may be known from the first by an imperfect eruption, the vesicles rising very little, being rather livid than florid, and filling, or, as the phrase is, maturating, badly. If at any time the pustules flatten, and the skin becomes pale or livid, the danger is great, especially if the pulse and strength fail, and the mind is observed to wander. The occurrence of any urgent internal determination is to be dreaded, whether to the brain, as shown by delirium, coma, etc., or to the respiratory organs, with pain in the side or chest, cough and dyspnœa.

The *sequelæ* of smallpox are often very serious. Deformity and blindness, with sometimes a permanent ophthalmia, a chronic diarrhœa, anasarca, occasionally follow it. The voice is, in some, permanently changed, and rendered disagreeable, by injury done to the soft palate. Scrofula is said to be excited to severe and rapid development, and the predisposition to pulmonary disease generally, but more especially, tubercular or scrofulous phthisis.

Autopsy.—The variolous eruption is found, not only on the skin, the vascular network or *rete mucosum* being the seat of the pustules, but extends to the mucous tissue lining the mouth, fauces, pharynx, trachea, larynx, and rectum, and upon the conjunctiva. The structure and formation of the pustule in these positions, is not well made out. In the cutaneous integument it is multicellular. The *pit* is occasioned by the sloughing of a circular portion of the *cutis vera*.

In many subjects, the brain and its membranes are found dark with vascular congestion. In others the lungs are engorged and hepatized, and the pleura inflamed.

Treatment.—During the eruptive fever of smallpox, if we are aware of the nature of the case, there is little temptation to interfere, when the attack is mild. I know not that there is any risk or evil, in the ordinary management of fever prudently applied here. If at the time of access there are exhibited determinations to the head, lungs, stomach, &c., peculiarly violent and severe, the lancet may be used, and its effect aided by mild purgatives. The mercurials are supposed to exert here a peculiar efficacy, but of this I am not satisfied. Great gastric oppression, with foul tongue and fetid breath, require an emetic, especially if the retching be insufficient, and fail to empty the stomach of its crude contents and morbid secretions. Mild emesis can scarcely do harm, and is serviceable besides, by favoring a centrifugal determination of the fluids. It tends to relieve the infantile convulsions which precede the eruption.

Purgatives which may be used with moderation at the invasion of the eruptive fever, must be abstained from when the papulæ are forming upon the skin; after this the bowels should be opened by laxative enemata, if there be protracted costiveness.

The use of the warm bath should be one of the earliest measures in the management of the unwashed and ill clad of the lower class. It is beneficial to children attacked with convulsions, who may be relieved with the lancet cautiously employed, if the pulse be full and hard, and the face flushed; and on the other hand, if pale and feeble, may be tranquillized with small doses of the tinct. opii camph. The apartment of the sick should be well aired and perfectly clean. He should lie on a firm mattress, and if able, sit up occasionally. The cool regimen, so vastly preferable to the heating system anciently in vogue, must not, however, be carried to an extreme. It will, if urged, do harm, when the pulmonary symptoms are prominent. Nor do negroes in general bear it well, unless much modified.

Light mucilaginous drinks should form the only nourishment. The sore throat should be gargled often with tepid water, and the inflamed eyes washed from time to time with milk and other mild collyria, and carefully protected from light and other irritants.

To prevent the pitting, so much feared, many expedients are proposed. I have not confidence in any one of them. The resort to them in confluent smallpox and really severe cases is trifling, and in distinct smallpox there is little deformity left.

In the secondary fever, most advantage is derived from the mildly stimulating diaphoretics, as the infus. rad. serp., with slight additions of ether, camphor or ammonia. I employ *opium*, unhesitatingly and freely, when it is required to relieve the cough, dyspnœa, restlessness and other sufferings of the patient. It does not seem contra-indicated by any circumstances, but those which show a tendency to coma. I prescribe Dover's powder or the camphorated tincture.

In protracted cases, when the strength yields, cinchona is of much service. The infusion may be combined with other remedies. Extensive crusts are rubbed off occasionally by the motion of patients in bed, leaving painful sores. These must be dusted with cinchona or finely powdered chalk, the pressure of the body frequently changed by the attendants, and extreme cleanliness inculcated.

If the "striking in" of the eruption, as the phrase is, occur, the pustules flatten and become indistinct, with failing pulse, and cold and livid surface, it is necessary to stimulate promptly and energetically, both by internal and external means.

The treatment of the convalescent requires much attention. He is covered with a new and highly susceptible integument, and is specially liable to the ill effects of exposure and alternations, from which he must be guarded strictly by proper clothing. His diet should, for a long time, be plain and unstimulating, though nutritious.

Variolous contagion is both *palpable* and *impalpable*. It may be communicated palpably by contact with the diseased person or with fomites, and by inoculation, or the direct insertion of smallpox matter into a wound. It is also capable of diffusing itself impalpably through the atmosphere. At what stage of the case a sick body becomes thus, a focus of contagion, is not clearly known—perhaps from the seventh day, when a peculiar odor or effluvium begins to be given off. It is strange to see so much stress laid upon the etymological meaning of the word contagion. *Contact* is undoubtedly necessary with *the cause of disease*, "causæ non agunt, ubi non sunt." It is altogether unnecessary to come in contact with *the sick person* from whom the *contagious effluvium*, *the cause*, emanates.

The *latent period*, the interval between infection and invasion, is also doubtful; it is usually rated at from nine to fourteen days. The effects of inoculation show themselves earlier—about the fourth day.

Smallpox attacks the same person but once—a rule clear and positive, though not without exceptions. This exemption gave great importance to the practice of *inoculation*, which enabled the subject to select his own time and circumstances for suffering the disease. It is difficult to account for the immense difference in violence and mortality between the casual and inoculated smallpox.

Variola is liable to many modifications in history and character, some of which have been pointed out and separated in common language by special denominations, while the strong similarity which they present to each other and to the common stock of all, is indicated in the use of a word now become familiar everywhere, *Varioloid*.

All the old writers speak of irregular forms of smallpox. Sydenham is particular in detailing the varieties which the disease offered, in the several years of its epidemic occurrence under his own notice. Lieutaud speaks of a "spurious smallpox," occasionally taken for the legitimate. Parr tells us that "the varieties of smallpox are numerous." It was only among the English, and not by them until the time of Heberden, that *Varicella* (chicken-pox) was distinguished from smallpox. Morton, of the time of Sydenham, speaks of it as "mild smallpox." His contemporary must so have regarded it, if he met with it at all. And though it is usual to talk very positively of the distinctions between the two, yet we are not always able to mark them so clearly.

While Willan recognizes it only as presented in the serous or vesicular form, Rayer acknowledges that it occasionally assumes a pustulous condition. With regard to the grade, which is made the source of distinction between distinct and confluent smallpox, it should be remembered that Ring has given us a case of confluent chicken-pox, and that McIntosh has recorded two fatal cases, one in a child, the other in an adult. Heberden speaks of a malignant sort of chicken-pox, in which "the continuance of the pain and fever, after the eruption, and the degree of both these, though there be not above twenty pustules, are, as far as I have seen, what never happens in the smallpox." Chicken-pox has been known to pit the skin, and distinct smallpox often fails to do this. If we receive the diagnosis of McIntosh and others, who discern chicken-pox by the succession of crops and pustules, what shall we say to Heberden's acknowledgment of its unequivocal occurrence in four cases of smallpox? These are "the only instances" he says, and his language is striking, "which have happened to me, something like what is so *often talked of*, a second crop."

It seems to me that the above observations, which I have taken in preference from the older writers, exhibit plainly enough the difficulty, occasionally presenting itself, of distinguishing smallpox from its kindred affections, if indeed they do not establish an identity of character and origin between them.

I allude to those which are familiarly included under the newly-invented term varioloid, first used by Thompson in describing an epidemic, which prevailed at Edinburgh in 1811.

The *diagnosis* of *small*-pox, as separating it from varicella, though spoken of very slightly by Gregory, cannot be a matter of such practical facility as he represents it. I have myself seen and known mistakes made on the subject. Thompson, a very competent observer, maintains their identity; and his facts are not easily set aside, nor his arguments readily answered. Bateman, too, closely attached as he was to Heberden's and Willan's views, found reason to doubt their correctness here, as appears from a letter written by him to Dr. Howitz, of Copenhagen, in which he says: "I am much inclined to concur with you in the supposition that chicken-pox is, in fact, modified smallpox."

In the 5th vol. of the *Trans. Am. Assoc.* we find it stated that about the middle of Jan'y, 1851, smallpox broke out in the jail of Montgomery, Alabama. The first case was that of a negro man, recently from New Orleans, who said that he had been, a short time before, in attendance upon a gentleman, "who was said to have chicken-pox."

In the winter of 1853, a member of the Class of the Charleston Medical College died of smallpox. He received the infection from a case pronounced by a respectable physician to be chicken-pox, which was in this way the centre of a considerable number of attacks.

Perhaps we shall best be able thus to explain the occasional occurrence of smallpox, to all appearance spontaneously arising, or under circumstances that forbid all usual explanation; as in the instances formerly referred to in the Pennsylvania Penitentiary; in Lawrenceville, Illinois, as related by Dr. Banks; and that which came under my own notice in the Charleston Workhouse. The irregular and anoma-

[redacted] others, and known [redacted] alline-pock, swine- [redacted] by the common title of [redacted] lly *varioloid*, as re- [redacted] it. Thus we avoid the [redacted] panic. We evade all [redacted] exclusion, seclusion and [redacted] individual develops [redacted] we have lost the clue [redacted]

[redacted] to have formerly [redacted] perhaps in part [redacted] peculiarities or special [redacted] idiosyncrasies [redacted] our own eyes; as [redacted] observations, in the [redacted] in all appearance trace- [redacted] ly severe disease, [redacted] mildest variety ever [redacted]

[redacted] and widely diffused dis- [redacted] ly, of the vaccine; [redacted] frequent and more [redacted]

[illegible] treat, derives its [illegible] to the medical [illegible] unhesitatingly [illegible]

[illegible] remark of [illegible] they are [illegible] is plausibly, [illegible] known to the [illegible] Hindostan [illegible] dairy coun- [illegible] that their [illegible] about the [illegible] a pustular [illegible] to have con- [illegible] infection of [illegible] that the [illegible] who had [illegible] There was [illegible] cial com- [illegible] was tried first [illegible] with the [illegible] on this [illegible] publication [illegible] its way [illegible] and angry debate, established on the most authentic basis, and the zeal of its promulgator amply rewarded by the British Parliament. Since that time the vaccine has been extended all over the globe, and all nations of mankind have exulted in the benefits thus bestowed upon them. To the present time it has enjoyed the undoubting confidence of the profession, and at once superseded, and almost entirely suppressed, the practice of inoculation.

Vaccination is performed by introducing under the cuticle a small portion of lymph, taken from a vesicle about the eighth, ninth, or tenth day, while yet the fluid distending the vesicle is transparent and colorless. The puncture remains unchanged until the third or fourth day, when slight elevation and inflammation are perceptible, which increase slowly. About the sixth, it assumes a regular circular form, with a depression in the centre. The vesicle is completely developed on the eighth or ninth day, and attains the average diameter of one-third of an inch. An areola now surrounds it, of an intensely florid red color, and some febrile excitement of the system is perceptible, with stiffness, pain, and slight swelling under the arm, if the vaccination be performed about the usual spot, above the elbow. The diameter of the areola differs from one to two inches. It is attended with a degree of roughness, hardness, and intumescence of the skin over which it spreads—circumstances which denote its existence and extent in the black. The vesicle is multicellular, that is, composed internally of numerous spaces or little cells, which communicate freely with each other. The fluid within these cells begins to dry away on the eleventh or twelfth day, having previously lost its transparency, and become milky, or straw-colored; the areola at the same time declines, and gradually disappears. About the twenty-sixth day, a hard, round scab, of rosewood color, smooth on the outside, and remarkably hollowed in the centre, falls off, leaving a permanent cicatrice, of peculiar and characteristic aspect—its surface being marked with minute pits or depressions, similar to those on the head of a thimble, "denoting," probably, "the number of cells of which the vesicle has been composed." It was stated above, that in variolous inoculation, the vesicle forming at the point of insertion is accompanied by the eruption of others in different parts of the body; this, as respects vaccine, is a fact of very rare occurrence. Two such instances, however, have been communicated to me.

I shall not attempt to describe any of the numerous deviations from the above history, which are to be met with in the irregularly diversified forms of what are called "spurious vesicles." Suffice it to say, that any striking or obvious departure from the ordinary phenomena, in the progress of a vaccine pustule, should make us cautious of confiding a patient to its protective influence. Vaccine, like every other disease, may undergo certain modifications from the condition of the recipient, an infinite majority of which are slight and unessential, not affecting its character and influence, nor impairing its genuineness. Others there are, however, though few in number, which change the nature of the specific action, either locally or in its effect upon the system, and thus render it "spurious." Of the local modifying causes, the principal and most common is the mechanical irritation of the vaccinated spot (as by rubbing), by which a common inflammation is substituted for the specific, and a common sore produced. Erysipelatous inflammation may also supervene, and interfere with the formation of a regular vaccine pustule. Vaccine may, perhaps, be affected by or combined with some forms of constitutional disease, and thus take on a *hybrid* state. All cutaneous affections disturb the regularity of its progress, if they do not hinder the success of the operation; and no physician should employ vaccine lymph from a pustule on the arm of a patient known to labor under scrofula, herpes, or lues venerea.

I am disposed to lay some stress upon the progress of maturation of the vesicle, although this may be slightly hastened or impeded, without detracting frôm the value of the pustule. Thus, the temperature of the season, if high, may occasion it to anticipate twenty-four or thirty-six hours perhaps; and severe cold, on the contrary, by checking the cutaneous circulation, may retard it in an equal degree. The debility or robustness of the subject may give rise to like results.

The pustule should be prominent and clearly defined, and the areola distinct and vivid. There should attend some febrile disturbance of the general system. The appearance of the scar, as above described, I consider of much importance. We should revaccinate when this peculiar appearance is wanting, and when the scar is smooth, or resembles that of a burn.

I do not find the observation made by any writer, but I have certainly noticed the occurrence of a doubtful or spurious vesicle to cause much difficulty in procuring, subsequently, the satisfactory results of vaccination in the production of a regular or genuine pustule.

Vaccination is, of course, best and most successfully performed with fluid lymph, taken immediately from the vesicle, but this simple mode of communication is not always possible. When required to be transported to a distance, or kept for any length of time, it may be preserved by various methods. The fluid is caught on a small plate of glass, which is pressed closely against another of similar size and shape, and the edges waxed, to prevent the access of air. We receive it on the points of quills, likewise protected from the air by envelops. Cotton thread is dipped in it, and laid aside with equal care. But in the scab we have the most convenient means of preserving and transporting this invaluable agent. It has been kept for years, and found capable of communicating the genuine disease, just as when recent. It may be protected from the contact of air and moisture, by immersion in softened wax and spermaceti. It is scarcely necessary to remark, that the first scab alone possesses the specific vaccine character; if this falls off, or is rubbed off too early, another may succeed it, but possesses none of its useful properties.

Climate undoubtedly influences much the susceptibility of the human constitution to vaccine. The missionaries to Siam were endeavoring to introduce it into that country many years before they succeeded. Perhaps this may have been owing in part to the difficulty of preserving the vaccine in very hot weather. This is well known in the southern States, where it is common to cease vaccinating during the warm months, and procure a new supply of vaccine from the North at the approach of winter.

Some have strenuously urged the propriety of recurring occasionally to the udder of the cow, the original source of vaccine, to insure its genuineness, and renew it from time to time; but it may now be looked on as settled, that its primary and essential characteristics are unchanged and unimpaired by any imaginable number of transmissions. Nay, more, it is obviously improved by thus passing through the human system; it is so modified as to have become a milder malady, though not less effectual in its influence on the constitution. A person inoculated directly from the cow, always suffers much more, it is said, than one who receives the infection from a human vesicle, and, as far as has been ascertained, with no corresponding advantage to compensate.

Among the animals which have been found capable of receiving and communicating the vaccine, are the horse, the ass, the camel, the buffalo, the goat, the sheep, and the baboon.

It has been doubted whether variola does not exert a reciprocal influence upon vaccine, whether it tends to prevent its introduction into the system, or in any manner or degree modifies it, and disturbs its regularity when so received. But the most positive proof has been obtained of the transmission of perfect vaccine through constitutions previously subjected to the variolous impression. It has been, in this way, brought across the Atlantic, by the successive vaccination of individuals among the passengers and crew of the vessels, many of whom were known to have had the smallpox. This is one among the facts which make me still doubt the correctness of the opinion that vaccine is only variola, modified by passing through the system of a lower class of animals.

Much has been said of the difficulty of communicating the disease more than once to the same constitution. Gregory, of the smallpox hospital, declares that "it is impossible, or nearly so, to reproduce the vaccine, in anything like its genuine form, when the cicatrix left by a preceding pustule is perfect, and the result of a perfect vesicle."

Dr. Darrach, of Philadelphia, in experimenting on this subject, found that the repeated insertion of the matter in the arms of vaccinated children, occasioned a local disease exactly similar to that produced by the first operation, with the exception that the pustule and scab were much diminished in size. In none of these cases could fever, or any other constitutional effect, be discovered. Unprotected children were, with complete success, vaccinated from one of these scabs, not larger than a line (one-twelfth of an inch in diameter), which was the result of a fourth insertion of the virus.

The duration of the influence of the vaccine—the permanency, rather, of the effect which it has wrought upon the system—has been denied by some who are stanch believers in its temporary power to destroy the susceptibility of the body to the invasion of smallpox. But the mass of facts collected under this head, certainly goes to prove that whatever may be the result of the vaccine inoculation—whatever the impressions made by it upon the organism—this result, these impressions are not likely to be impaired or obliterated by any process of time, or any changes in the state of the system from any cause. Of two hundred and fifty cases collected by Dr. Gibson, "in which smallpox is said to have occurred after vaccination, it appears that by far the greater number had been vaccinated less than two years." In Dr. Thomson's account of similar eruptions, they occurred at various intervals after vaccination, from a few days to fifteen years, not warranting, in any degree, the suspicion that the power of the vaccine is weakened or exhausted by time. I am, nevertheless, disposed, on the ground of seeking the highest ultimate security, to advise *revaccination.* It is possible that the first infection may have been something less than complete in its action on the constitution. It is also possible that the vehement energy of an epidemic variola may require extra protection by recent and thorough subjection of the system to the mild influence of the vaccine.

To ascertain the true influence of vaccine upon smallpox, is an object of the utmost importance. I will, therefore, briefly and formally recapitulate the points fairly established, by a due consideration of the facts collected on every side.

First.—Vaccination is no longer to be regarded as exhibiting the absolute power of preventing the access of smallpox. In *some persons,* it does seem completely to destroy the susceptibility to variolous contagion; *in all,* it diminishes notably, though in different degrees, the liability to be infected.

Secondly.—The introduction of the vaccine virus into the system in its genuine form, and in the proper manner, never fails to produce there such changes as to *modify certainly* the future influence of the variolous poison, if, under any circumstances, it should affect the constitution.

Thirdly.—The *modification* thus asserted, does not appear to consist *essentially* in a diminution of the violence or duration of the first stage, the eruptive fever. This, though it is, in general, very slight, may be as severe as in casual smallpox.

Fourthly.—Nor does it appear to imply *essentially* a diminution of the quantity of eruption upon the skin, although the number of pustules is usually very limited in smallpox after vaccination.

Fifthly.—The great power of the vaccine unquestionably consists in modifying the *progress of inflammation* in the variolous eruption. Hence, the slighter degree of cutaneous irritation, which terminates in numerous instances without secretion of either lymph or pus—the less amount of matter formed in the pustules (when effusion does occur)—the sudden check given, in a majority of cases, to the suppurative process after it has commenced—the early disposition to rapid drying. Hence, the absence or transient duration of ophthalmia, which with ulceration of the cornea and destruction of the eye, constitutes the worst and most unmanageable sequel of unmodified smallpox. Hence, the rare occurrence of sloughing of the cutis, and consequent pitting, seaming, and scarring of the skin. It has now become, happily, as unusual as it once was common, to see a person deformed with these marks of smallpox. Hence, lastly, the infrequency of what is termed secondary fever, and its mildness when it does show itself. This is well known to be the most dangerous of the several stages of unmitigated smallpox; it is tedious in duration, and leaves scarcely one constitution in a thousand, without inflicting severe injury and permanent deterioration. The convalescence from smallpox is, on this account, in the unprotected, notoriously slow. On the other hand, there is no convalescence more rapid or more perfect, than that of a patient who has been assailed after vaccination. He recovers both perfectly and promptly.

"Observe," says Dr. Gregory, "how strikingly opposed to" (contrasted with) "each other, in this respect, are the influences of inoculation and vaccination. Inoculation lessens the quantity of eruption, but does not alter, in the slightest degree, the progress of inflammation in that which is thrown out. Vaccination, on the other hand, while it does not (necessarily) affect the quantity of eruption, always influences, more or less, the progress of inflammation in it."

Sixthly.—Nor, can it be denied that, as far as we have a right to draw our conclusions from the tables of mortality, published in reference to this question, vaccination tends much more surely and effectually to the *prevention of fatal results* than inoculation. Thus, among the cases stated to us by Drs. Bell and Mitchell, as occurring in Philadelphia, in 1823-24, out of 248, 64 had been previously vaccinated, 1 only died; 7 had natural smallpox previously—three of these died; 9 had been inoculated—three of these died; 13 unknown—no deaths. Of those entirely unprotected (155 in number), there died 85, more than one-half—a dreadful mortality.

It is surely impossible to set, in a stronger light, the advantages of vaccination, than is done in the above paragraph. Results, similar to these, are given in the annual reports of the National Institution of Great Britain, and in every other authentic document, without exception, to which we have access.

If we ask, how this ancient and justly dreaded pestilence has been deprived of its terror, and shorn of its fatal energies, what shall be the impartial answer? Not by any change in the nature of the case, not by any loss of its inherent power over the human constitution, for the mortality among the unprotected is most appalling—greater than that of yellow fever, or, perhaps, even the plague. Nor is it owing to such protection as inoculation affords, for that practice has been obsolete for the last quarter of a century. But it is clearly attributable, and we do not hesitate to ascribe it, to the kindly influence of the vaccine—the most valuable among the generous benefits conferred upon their fellow men, by the cultivators of the divine art of healing.

MEASLES—(*Morbilli—Rubeola.*)

A specific form of fever, eruptive, contagious, inflammatory. It is often epidemic as well as contagious. It is difficult to communicate by inoculation, but Home and Speranza affirm their success, employing blood taken from the vivid patches of eruption; and Von Katona inoculated great numbers successfully, both with blood so taken, and with tears.

Symptoms.—Rubeola makes its appearance with the ordinary tokens of catarrh. There is rigor often, followed by heat of skin, headache, hard and frequent pulse, soreness of throat, watery redness of the eyes, sneezing, a hard and dry cough, nausea and retching. In children, convulsions occasionally attend. This state of things may continue for many days, but usually on the fourth the eruption breaks out, at first visible on the face and arms, gradually spreading over the body. It is in crescent-shaped patches of small brownish red spots, rough and a little elevated. The fever generally abates on its showing itself. The eyes suffer much from it, the adnata being covered, and the lids swollen. It begins to fade on the seventh, and soon dies away, the cuticle desquamating in minute branny scales. In the progress of measles, or at the subsidence of the eruption, pneumonia may develop itself. At this latter period, diarrhœa of obstinate character often arises. Rubeolous ophthalmia is apt to be persistent.

The *prognosis* in measles is generally favorable, and the danger is fairly proportioned to the attendant maladies above mentioned, the pulmonary inflammation especially. In children, the convulsions are occasionally, though not often, fatal. It sometimes happens that the fever is of low typhous type, which is unfavorable. The "striking in," or sudden disappearance of the eruption, is also unpropitious, and excites well-grounded alarm.

The *diagnosis* does not seem to me difficult; yet it was not until the end of the 17th century, that measles were separated from smallpox, a confusion which we should now regard as impossible.

It may be confounded with scarlatina, which has, indeed, been called confluent measles. This very phrase suggests a distinction, for the patches of rubeolous eruption are usually separated by notable intervals. In 1829, however, I saw some cases in which they were nearly confluent. In scarlatina, the deep diffused redness of the tongue and mouth is diagnostic. The catarrhal affections are prominent in measles —the sneezing, coughing, &c., and the ophthalmia, which is often absent, and very seldom severe in scarlatina.

Pathology.—One might almost venture to declare that rubeola consists in the combination of some peculiar exanthema with catarrhal fever. This affects the human constitution but once, a rule presenting very few exceptions. The eruption may occur alone, a circumstance not unfrequently met with in rubeolous epidemics—the rubeola incocta of Good, R. sine catarrho of Willan, the bastard measles of common people. Now, by this form, the susceptibility to a second attack is not destroyed, nor even impaired. Other varieties of measles are noticed by writers—R. nigra, R. maligna, R. variolosa. I have met with none of these. The concurrence of measles with typhous fever presents a livid eruption, with great danger, a compound of nigra and maligna.

Some instructive and interesting remarks occur in Panum's account of the Faroe Islands, which I transcribe here. "In those remote and secluded places, and among their sparse population, opportunities occurred for observations, not easily to be made elsewhere. Measles had not visited those islands for sixty-five years; in 1846 they were introduced, and there were nearly six thousand cases in six months. It was most serious in very old people and infants; one hundred and two deaths took place. A visit to a neighbor is, among the inhabitants, a rare event, and thus the progress of the disease was rendered traceable. The eruption occurs fourteen days after exposure to infection; this is a rule, as he affirms, well made out. The catarrhal stage is not of definite duration; it may precede the eruption two or three days. The contagion was strongest in the eruptive stage. Not one of the old people who had had the disease sixty-five years before was now re-attacked, although others as old, and adults generally, were found to be as liable as children. Some young people, constantly exposed, escaped. Many hamlets, some of them of more than one hundred inhabitants, were preserved intact, under a system of strict quarantine, or isolation; even the doctors being forced to undergo purification." Contagion was found to be retained in clothing of wool and hemp.

Dr. Thomas informs me that in an emigrant ship, on board which he was passenger, measles broke out, the eruption showing itself on the fifteenth day after leaving port. Thus in many ways we fix upon a double septenary interval, as the latent period. Gregory says that the relation between the rigor or invasion of measles, and the exanthem, is of quartan type, as that of smallpox is tertian.

It would seem that the immunity given by measles is more perfect than that of any other disease. Few instances of second attack occur. It is probable that the susceptibility to it is less universal, and less uniform than to smallpox. Many escape altogether; many escape special exposure at one time, who take it afterwards with much less, as we know that persons have failed to receive it when sleeping in the same bed with a patient, who afterwards took it without knowing how.

As the eruption may exist without the catarrhal affection, so there may be an indefinitely long stage of incubation, during which the subject shall suffer from a mingled train of indefinite and oppressive ailments, all of them coming to an abrupt conclusion on the appearance, often unexpected, of the crescentic patches of brownish eruption. These circumstances have led to the notion that in this, as in all other instances of the exanthemata, so called, some injurious morbid matter is got rid of by the skin; but nothing can be more vague or conjectural than this received opinion.

Treatment.—It seldom happens that the catarrhal symptoms which precede the eruption, are sufficiently severe to call for any remedial management, and the nature of the case is first shown by the appearance of the red patches on the surface. Under ordinary circumstances it is best not to interfere, farther than to keep the patient at rest, and on low diet, regulating properly the temperature of his apartment, which should be moderately, but not unpleasantly warm.

In an occasional case, something more may be required. If there are tokens of pulmonary inflammation, and the pulse will bear it, venesection may be resorted to, and the cautious use of the lancet followed by the administration of a cathartic, combined with a diaphoretic, as the solution of Epsom salt in the infus. rad. serp. The vascular excitement being thus reduced, the diaphoretic should be continued, with some demulcent and anodyne preparation, to relieve cough and procure rest. Cups or leeches to the chest may be demanded, and the thorax enveloped in warm poultices, if the dyspnœa be severe. In children affected with much gastric disorder, and convulsions, the emetic is useful, given, perhaps, while the subject is in the warm bath, and followed by a mercurial cathartic. The eyes should be kept clean with tepid water at first, and afterwards washed with mild astringent collyria. If diarrhœa comes on, upon the subsidence of the eruption, small doses of opium will restrain it, aided by the cretaceous mixture, with kino, or by small doses of acet. plumb.

The pectoral uneasiness remaining after measles, is best removed by the persevering application of successive blisters to the chest, or the irritation of the tartar emetic ointment, while we administer full doses of Dover's powders nightly.

The sudden disappearance—"striking in"—of the eruption, is always alarming, and apt to be attended with convulsions in children; and in adults, with dyspnœa and abdominal distress. If the pulse be full and hard, we must bleed freely; but if, on the other hand, as is more common, the patient has sunk into a sort of collapse, we must resort to the highest order of stimulants. The hot bath, of 100° Fah. at least, must be made ready, while we apply sinapisms to the cold and pale, or livid surface; the camphorated tincture of opium, with the volatile alkali, and hot wine or brandy, must be given boldly and in abundance, until the skin becomes warm, and the pulse rises.

When rubeola is accompanied with fever of typhous character, it is proper to premise a mild emetic, after which a mercurial cathartic will be of service, followed promptly by the stimulating diaphoretics, which should be persevered in, adapting the doses to the condition of the patient, and the effect produced.

The convalescent from measles requires to be treated with caution. His diet must be mild and unstimulating, though nutritious, and he must be clad warmly, and guarded from all exposure.

SCARLATINA—(*Scarlet Fever.*)

A contagious, eruptive, pyrectic disease, characterized by a peculiar efflorescence of a very florid red hue, whence the name designating it, first described about the middle of the seventeenth century. It is often epidemic as well as contagious. It has been communicated by inoculation, and, as has been asserted, with the same effect as in small-pox, of procuring a milder disease. As a general rule, it attacks but once the same subject.

Scarlatina is divided by writers, commonly, into three varieties: S. *simplex*, S. *anginosa*, S. *maligna*. I regard these as mere differences in degree of violence and intensity. The attack is ushered in with irregular shivering, attended by oppression at stomach, and nausea, with occasional vomiting; then succeed heat of skin, thirst, frequent pulse, and headache, with sometimes delirium. The eruption appears generally on the second day, but may postpone until the third or fourth, showing itself first on the face and neck, and gradually spreading over the trunk and limbs, until it almost covers their surface. On the succeeding day, the lining membrane of the mouth, fauces, and pharynx, becomes inflamed; with ulceration of the tonsils and uvula, in the anginose form. The tongue throws off its fur, and assumes a deeply red color, the surface being at first smooth, but soon shining with elevated and projecting papillæ; it is acutely sensible to the touch, or to the application of temperature either above or below its own.

The efflorescence, which, in many cases, is almost confluent, is bright red, hot, dry, little elevated or rough, indistinctly papular. The skin seems thickened. On the fifth and sixth days it begins to fade, and desquamates gradually in minute branny flakes. At this time the hands and feet are swollen, and, for some short period, the new surface remains morbidly sensible, especially that of the mouth.

The inflammation in the *anginose* form is not always attended with ulceration, but sometimes the tonsils are covered with flakes of lymph or false membrane.

In bad cases the eruption comes out irregularly, and is ready to recede. When this occurs, congestion or inflammation of some internal organ is prompt to follow, and we have either dyspnœa, with thoracic pain, or vomiting and purging, coma, or convulsions. If the patient be not quickly relieved, the pulse sinks, the countenance becomes ghastly, the complexion pale or livid, the skin cold, and death rapidly hastens on. During the prevalence of an epidemic scarlatina, especially if of malignant or severe character, we meet with cases, among exposed subjects, of sudden convulsion or coma, with flushed face, injected eye, attended usually with nausea and retching. There is sometimes, but not always, efflorescence on the skin, especially of the face and neck. Such attacks are occasionally fatal within a few hours apparently by the vehemence of cerebral disorder.

By the term *scarlatina maligna*, I would designate those cases in which the fever assumes the typhus type.

This is common in some localities, where the epidemic visitations of scarlet fever are highly dreaded. The eruption in these attacks may be early or otherwise. The throat is affected with ulceration, which has a tendency to slough, is of an ash color, and gives out a fetid odor, and an acrid discharge, excoriating the nostrils, offending the stomach and intestines, and producing vomiting and purging. The internal organs are often attacked at the onset; there may be delirium, often quiet and playful, dyspnœa with mucous râle, and intestinal or peritoneal inflammation. The termination of this variety is often fearfully hurried, taking place from the third to the fourth day. Recovery is very slow, and for a long time doubtful.

The convalescence from scarlatina is attended in many cases with anasarca, and, in some, with general dropsy. The kidneys, which, indeed, rarely fail to exhibit tokens of disease during the attack in the morbid qualities of urine execreted, almost uniformly suffer more or less during convalescence. The discharge is either scanty and high colored, or turbid, and tinged with blood, and strongly albuminous.

Autopsy.—The appearances, on examination after death, vary. In some, there is engorgement of the brain, and vascularity of the membranes, with effusion. In others, the lungs are congested and hepatized; in others still, there is injection of the mucous surface of the stomach and intestines. As we should expect, the kidneys are variously altered in appearance; showing congestion, inflammation, and granular or fatty degeneration.

Diagnosis.—I have not found it difficult to distinguish scarlet fever from measles, which it most resembles, by the want of catarrhal symptoms in the fever of incubation; by the confluent extension, and the peculiar appearance of the eruption, which in measles is in patches, crescentically disposed, more distinctly papular and more prominent. The scarlet tongue, with elevated and swollen papillæ, is also characteristic. They differ much in the sequelæ to which they subject the patient. The books make a confusion between scarlatina and cynanche maligna. In the instances of the latter formidable pestilence which I have met with, the eruption was a mere superficial erythema; and the tongue continued furred thickly to the end.

There are mild attacks of scarlatina which are hardly notable as disease. These are not distinguishable from many irregular varieties of cutaneous efflorescence, talked of as "nettle rash," "scarlet rash," "surfeit," and so forth. These are only supposed to be scarlatinous, when they occur during an epidemic, or in a household suffering under marked cases. A great many such present themselves, impossible to diagnose by their own individual characters, but probably of true specific nature, and conferring future immunity.

Gregory (of London) is disposed to dwell on the "rapidity" of scarlatina in every step of its progress as diagnostic; but Barthez and Rilliet say it is slower than measles. The latent period is laid down at seven days, but Withering says he knew it as brief as three; and Bigelow relates an instance in which "a patient was taken with scarlet fever in forty-eight hours after arriving in this country by a passage of forty days from Europe." Here the latent period must have been less than two days, or more than forty.

The heat of skin in scarlatina is, except in malignant cases, particularly high, attaining, as Currie tells us, the point of 112° Fahrenheit.

Pathology.—In no case has the theory of a morbid poison, entering the body, largely generated or augmented there, and eliminated by the diseased processes, been carried so far as in the discussions concerning scarlatina. Gregory talks vehemently of "the mischief which takes place while the scarlatinal poison is in progress of concoction, and struggling like a giant in prison to work its way out." (P 158, Bulkley's edition.) Of a blind convalescent, he says, "the poison, raging uncontrolled, destroyed both eyes; he was never bled at all; he ought to have lost thirty ounces of blood from the arm." Does venesection eliminate the poison; or is it mixed in so large proportion with the blood in the cutaneous veins, that in thirty ounces withdrawn from the general mass, enough would have been taken away from the concocted virus to have saved the patient's sight?

I believe, with Miller, that the kidneys partake almost uniformly and essentially in the diseased condition, and that their function is badly performed from the first in all serious cases. Add to this the extensive inflammation of the skin, and the abolition, more or less complete, of its important functions; the impairment or suspension of excretion by the two principal outlets, and we have sufficient explanation of the universal poisoning, not of the blood only, but of every portion of the organism. Ulceration of the throat, with erosion of the jugular veins and of the carotid artery, immediately fatal; destruction of the bones of the ear with perpetual and incurable fetid discharge therefrom; blindness as well as deafness; dropsy in all its forms, anasarca especially, sometimes fatal, as I have seen; obstinate vaginitis and leucorrhœa; laryngitis; pericarditis; peritonitis; mania, diarrhœa, and dysentery; these are among the complications and sequelæ of this terrible pestilence.

Prognosis.—Scarlet fever assumes a diversity of forms, and the proportion of deaths varies greatly. The extent or confluence of the eruption; the type of fever; and the degree in which the internal organs suffer, indicate the force of the attack. If there were delirium or convulsions, or the ulcers of the throat assumed a gangrenous aspect, or dyspnœa supervened, and especially if, with any or all of these, there were combined a premature disappearance of the rash or efflorescence, we should know the patient to be in serious danger.

Anginose and malignant scarlatina will be found attended everywhere with a large proportional mortality.

I am apt to lay some stress, even in the early stages, upon the appearance of the urine. If this excretion goes on freely enough, and with but a moderate deposit, the prospects of the patient are probably good. In bad cases it is sometimes nearly suppressed, sometimes bloody or thick, and of highly offensive smell. Persistent albuminuria is unfavorable.

Treatment.—In general it will be sufficient to commence the management of the case with a mild cathartic. For children I prefer the castor oil; in adult cases, a combination of Epsom salts with magnesia or rhubarb, and some aromatic. In the great majority, no farther interference will be necessary. Small doses of tinct. op. camph. are useful to tranquillize the restlessness of the patient, and determine to the surface. The patient will be apt to suffer, in ordinary circumstances, from the "nimia diligentia medici."

Attacks of more than ordinary violence, however, occur, in which we are called on for farther aid.

If the vascular excitement be specially high, it may be reduced by the lancet. The throat being much inflamed, we may apply leeches at the angle of the jaw, or on the neck. An emetic will relieve occasionally the oppressed stomach, if it be not emptied by spontaneous vomiting. After the eruption is fairly out, the cathartic should be abandoned, and the case trusted to diaphoretics.

Currie, Gregory of Edinburgh, and other high authorities, advise strongly the cold affusion in scarlet fever, and attribute to it the best results; while, on the contrary, those who consider the cutaneous eruption in the exanthemata as a metastasis from the mucous membranes, which they regard as the seat of primary irritation, deprecate the application of cold water as extremely dangerous. Truth lies between them; and in general we may decide that the remedy, though safe, is not usually necessary, or capable of the striking good effects which some would teach us to expect from it. Should any form of visceral inflammation arise in the progress of the case, it must be combated with the usual remedial measures. I am not persuaded that the connection with scarlatina should modify the necessary treatment, beyond the observance of a prudent reserve, never out of place.

In *scarlatina maligna*, it is advised to begin with a prompt emetic, followed by a mild dose of calomel. The cordial diaphoretics are early required, and may be combined with other stimulants in requisite amount. Cinchona, the volatile alkali, and the tinct. op. camph. are among our best remedies. The hot bath should be used, if the surface is cold and pale or livid, and sinapisms extensively applied. If the bowels are not moved by the mercurial, enemata should be administered. The throat should be washed with tepid water, and steamed, and if there be from the ulcers much fetid discharge, likely to irritate the stomach, the emetic may require to be repeated.

Great confidence is placed by many practitioners, in the exhibition of the infusion of cayenne pepper, both as a local corrective of the morbid condition of the gangrenous ulcer, and as the stimulant best adapted to the exigencies of the case.

The dropsical affections which supervene so often during convalescence from scarlatina, must be treated as formerly advised, under the head of hydrops, with the modification that they allow and require an early and free use of tonic and aromatic formulæ, as the infus. cinchon., with rad. serp. and camphor, in small doses, or nitrat. potass. and nitrous ether.

I ought not, perhaps, to omit, that the German homœopathists propose the use of belladonna as a preventive of scarlatina in all its forms. They imagine it to excite a state of disease similar or identical with scarlatina. The speculation is ingenious, but it is not sufficiently confirmed. My own experiments with the belladonna have been altogether unsatisfactory, but there is testimony enough in its favor to encourage farther trial of it. I am disposed, also, to regard it as worthy a more extended employment during the progress of severe cases of the disease. It is, perhaps, the safest narcotic which we can prescribe for the relief of the extreme irritation and restlessness of our young patients. It may be given in the solution of the extract—℞.—Ext. belladon. gr. iij, aq. cinnam. ℥j, M. S.—To take from two to ten drops, ter die. Opium, which is vastly more efficient and certain in its effects, is often indispensable, but may seem unsafe, and may, indeed, be contraindicated by a congestive state of the brain, with torpor, drowsiness, and coma.

Watson speaks highly of the chlorate of potass. ʒij, to be dissolved in ℥ij hydrochloric acid, previously diluted with as much water, kept in a dark room, and well stopped, of which ʒij are to be mixed with a pint of pure water. S.—A tablespoonful or two to be taken frequently, according to the patient's age.

Labarraque's solution, Sodæ Chlorin. Liquor, ʒj to ℥j of water, sweetened with honey, is, perhaps, the best gargle in the offensive sore-throat of this disease. Yeast is also used. Some apply the nitrate of silver; I prefer the mineral acids.

The diarrhœa and dysentery of the latter stages should be carefully watched, and controlled at once with kino, tannin, acet. plumbi, and other astringents.

I have no experience with the inunctions so strongly recommended of late, to be made with bacon-skin and other oily articles.

The history of this pestilential disorder is of infinite interest to the profession. From the earliest notice we have of it, it seems to have been steadily, and in every way progressive; in the extent of space it occupies; in the frequency of its epidemic prevalence; and in its increased malignity and augmented proportional mortality. I have already spoken of the indefiniteness of its incubative stage; its infectious period is no less uncertain. It probably begins with the eruption, on the second day, and continues as long as there is desquamation of the cuticle. Nay it is, I fear, still longer. The offensive odor, so peculiar and characteristic, and at times so intensely oppressive, may be given off by a convalescent for several weeks; during all which time I am disposed to regard him as a focus or generating centre of contagion. Yet it is not often that we know the disease to be conveyed by fomites.

Its infecting distance is unknown; but all agree that it is exceedingly difficult to prevent its spreading in schools, by any method of insulation.

How it is generated, apart from contagion, we cannot conjecture; yet Gregory tells us of its spontaneous development in a young man, who went in to bathe when violently heated; and, also, repeatedly in the secondary fever of smallpox. Its first appearance in this country was in 1735, at Kingston, an inland town, fifty miles east of Boston, which seaport it did not affect until some months afterward.

I hope that experiments with inoculation will be continued under varied contingencies, and in connection with varied modes of preparation and management of the subject. In this, rather than any other mode, there seems to me to be some reasonable ground for anticipating an amelioration or mitigation of the revolting features of this destructive malady.

The special relations of the exanthemata to the various races of men deserve notice. Smallpox, fatal as it is to the white man, is greatly more destructive to the inferior tribes. The black suffers especially in winter, when he is very liable to be carried off by inflammation of the respiratory organs; pneumonia and pleurisy. But it is in the red race that the extremest malignity of this disease shows itself; undoubtedly aggravated by the savage habits of life, and their absurd methods of regimen and treatment. Whole tribes are said to have disappeared under its infliction, as, for example, the Mandans.

I know nothing of the course of scarlatina among the Indians, nor, indeed, whether it has been ever introduced into their wigwams. It attacks the negro as readily, I believe, as the white man; but so far as I have noticed, it is not more severe, nor more likely to be fatal in proportion. Perhaps it is rather less so. Measles is certainly more fatal among the darker races. Even in the mild climate of the Southern seas, it has proved extremely destructive to the inhabitants of the Sandwich Islands.

Much has been said of the difficulty of detecting these eruptive fevers in the negro. If it exist at all, it has been grievously exaggerated. Smallpox can be known as early as in the white, by the papular elevations on the skin, so easily felt, and, indeed, so striking to the eye of an observer. Measles betrays itself by the discolored patches on the palate, following a day or two of sneezing and watery red eyes with fever, and the crescentic patches of roughness on the cutaneous surface, so distinct to the touch.

Scarlatina, if anginose, cannot be mistaken; the redness and prominent papillary inflammation of the tongue is sufficiently diagnostic; and the skin is thickened as well as preternaturally hot. In mild cases it may not be discovered; but I have acknowledged the universal difficulty of distinguishing such attacks in all classes of subjects.

ERYSIPELAS.

Erysipelas is interesting from its complex character and relations. It is variously divided and subdivided. We may recognize three forms: erysipelas verum vel acutum; erysipelas phlegmonodes vel subacutum; erysipelas erraticum.

Acute febrile erysipelas is a true exanthem. Its contagiousness is established. It becomes epidemic, and associates itself with typhus and with puerperal peritonitis. It is not in any degree self-limiting nor self-protective. The phlegmonoid and erratic forms, indeed, sometimes adhere with unconquerable pertinacity, generating, as Copland phrases it, "a constitutional diathesis;" in some subjects recurring frequently from slight causes.

I doubt the absolute identity of these varieties of the disease; yet I admit the difficulty of proposing clear lines of separation between them.

Erysipelas is one of the oldest of all recognized morbid affections, having been well described by Hippocrates. We may, therefore, assume it to be a universal human malady, and regard its generating cause as of universal diffusion. Coarse living and intemperance undoubtedly give predisposition to it. Its exciting or immediate cause, as Gregory maintains, is ochlesis—vitiation of air, by crowding together men, whether sick or well. We thus readily explain its frequent association with typhous fevers everywhere.

Laycock has drawn the attention of the profession to the fact that the local inflammation particularly affects that portion of the surface which is supplied by the respiratory nerve, and which grows red in blushing and in anger.

The idea of its dependence upon a morbid poison was entertained by the ancients, and distinctly laid down by Cullen; but this morbid poison was believed to be, as the latter phrases it, "a matter generated within the body, and, as in other cases of exanthema, in consequence of fever thrown out on the surface of the body."

Wells first maintained, in 1798, the contagiousness of erysipelas, a doctrine now generally received. Gregory's large experience entitles his views to favorable consideration. He lays down the positions, 1st. "That the disease may commence in a hospital, without the suspicion of importation; and, 2d, that being so generated, it may spread from bed to bed by contagion." He ascribes to this "generating miasm" an influence "depressing to the vital power." He pronounces it "identical with that which produces puerperal peritonitis," a point still under controversy.

Walsh also defines erysipelas to be "a constitutional disease, depending upon a morbid state of the blood;" and holds "that the eruption and fever are the means taken by nature to get rid of the poison." That this, like the other exanthemata, is produced by the influence of a morbid poison acting upon the system, and that a morbid poison is generated within the system, I fully believe. But it seems to me a return to error unreasonable and obsolete, to assume that the effects of this poison—"the fever and eruption" to which it gives rise—constitute means of its elimination. The only natural methods of elimination are found in the functions of excretion, which are impaired, suspended, and we might say abolished, in proportion to the degree of febrile excitement and extent of diseased cutaneous action or eruption. The less eruption and fever, always the better for the patient; the poison is best eliminated where there is least of these.

Symptoms.—Febrile erysipelas attacks with chill, succeeded by headache, nausea, heat of skin, frequent pulse, delirium, pain in the head, back, and limbs. The eruption shows itself on the second day, with burning and itching, appearing first on the head and face, with diffuse redness and swelling, especially of the eyelid on one side. The inflammation is not florid, but of dusky hue, returning slowly, when made pale by pressure. It penetrates all the cutaneous tissues; and is attended with œdema, and sometimes sloughing of the subcutaneous cellular membrane. It extends sometimes within the mouth, spreading to the fauces, pharynx, and larynx; and the patient may be suffocated by œdema glottidis.

During the epidemic prevalence of erysipelas in the South and West, some years since (from 1841 to 1846), this cavity was so generally attacked that the disease came to be known by the appellation of "*black tongue*," from the intense inflammation and discoloration of that organ. The ordinary duration of the attack is about nine or ten days.

Sutton's description of this epidemic is graphic and accurate: "The attack was ushered in by a chill, lasting in some cases four or five hours, after premonitory symptoms for two or three days. This was followed by a high fever, swelling of the tonsils, submaxillary, parotid, and lymphatic glands of the neck; neuralgic pains darting over the side of the neck and head, frequently following the temporal artery;

the *tongue*, covered at first with a thick brown coat, soon became swollen, and often very dark in the centre, afterwards assuming a *blackish-brown color;* this was in the more malignant form, in which a dark-purple hue would sometimes spread over the pharynx, palate, and sides of the cheeks; deglutition in many cases was almost impossible. The mild form had sometimes only the appearance of cynanche tonsillaris. The eruption would commence at the angle of the mouth and nose, and spread over the face and head; and, in nearly every case, the throat became well while the erysipelas was spreading over the skin." Dr. Drake, who describes the epidemic from reports collected by him in Missouri and Mississippi, considers it to have been a compound of erysipelas and scarlatina. He also notices the fact that the anginose symptoms subsided as the erysipelatous eruption appeared and spread. Glossitis was in some cases the prominent portion of the attack. The proportional mortality is said to have been very great.

Under ordinary circumstances, the force of the malady expends itself about the face and head. The features are confused and lost, the ears thickened, and the eyelids so swollen that they cannot be opened; while from the nostrils there is an unpleasant and acrid discharge. Delirium attends almost always when the eruption spreads over the scalp. Vesications take place, and the cuticle splits, exuding a thin serous fluid.

Diagnosis.—This is found clearly enough in the description of the disease. The smooth, velvety feel of the thickened and hot skin will distinguish it even in the black, who is quite liable to it, and often suffers severely from it. There is a peculiar sense of burning, too, in the part, whence two of its names—St. Anthony's fire, and "ignis sacer." Its extent, the degree of swelling, the vesications, the proclivity to fix upon the head and face, are all characteristic, and sufficiently distinctive.

The *prognosis* depends much on the condition of the patient. Sporadic is less dangerous, generally, than epidemic erysipelas; and different epidemics vary in malignancy and proportional mortality. In pure air, and during early life, there is no very great risk, unless some complication is present, such as fever of typhoid character, or the parturient state. In advanced age, in childbed, in crowded hospitals and ill-ventilated domicils, many die. The dark hue of the inflamed skin; the soft, quaggy feeling of the part, denoting gangrene of the cellular tissue; a dusky vesication, with oozing of offensive matter; delirium, protracted, low, and muttering; coma, or prolonged vigilance—are bad symptoms. So is the extension of the inflammation within the fauces, or very widely over the face and scalp.

Autopsy shows usually the brain and its membranes injected with blood, and inflamed; effusions sometimes in the cavities or on the surface of the encephalon.

Treatment. — Unlike the other exanthemata, erysipelas requires prompt interference. Sporadic erysipelas in the young and robust, and in the country, demands generally, the antiphlogistic treatment—venesection, active purging, and the antimonial and saline diaphoretics.

Epidemic erysipelas, as occurring in cities and dense populations, is of very difficult management. In hospitals, and when the fever is of typhous character, depletion is almost forbidden; mild cathartics, with the use of diaphoretics somewhat cordial, such as camphor and ammonia, precede the resort to cinchona, wine and other stimulants, which often require to be freely used. The mur. tinct. ferri, in free doses, is asserted to be of great benefit, and, indeed, to act often here like a specific, "aiding nature to expel the morbid poison" to which it is attributed. Walsh holds up to us tartar emetic in this disease, also as specific. He prescribes it in the moderate quantity of a grain in twenty-four hours, dissolved and drank in a quart of any bland fluid. Having acted "sufficiently," it should be followed by sulphate of quinine. Tonics and aperients may be required in combination with it. Local applications are to be avoided as injurious. As purgatives, colchicum with magnesia are recommended by Graves; calomel with camphor by Copland.

I combine opium with calomel, to keep the bowels soluble, determine to the skin, and procure sleep and ease.

Locally, the inflammation is treated in an infinite variety of modes. Nitrat. argent. is rubbed all around its margin, to circumscribe it, and placed upon it as a lotion. It is perhaps the most generally employed of all our applications. Cold and warm water; dry powders; lard; ung. merc. fort.; laudanum; poppy heads; chloride of lime and carded cotton, are eulogized. Seeking the comfort of the patient, I encourage him to try several of them, and choose for himself. Of late, a poultice made with the fruit so much used at our tables—the cranberry—has been recommended extensively.

Erysipelas phlegmonodes differs much in its history from exanthematous erysipelas. Here the eruption precedes; the fever is symptomatic; in some violent, in many scarcely pronounced at all. The local inflammation which selects in preference, like the exanthematous, the face and head, but is met with all over the body, and frequently fixes upon the lower extremities, is the important element. It is less diffuse; the swelling projects more, with throbbing; and pus is apt to form under the skin, which ulcerates, with unpleasant discharge.

Its usual *cause* is said to be intemperance or bad living.

In the *treatment*, I would improve as much as possible the condition of the constitution. In a robust, plethoric patient, I would resort, perhaps, to venesection—to low diet, certainly. The bowels should be moved by a resinous purgative or mercurial. Alkalies with diuretics, form a very useful combination—magnesia and colchicum, or infusion of cinchona and serpentaria with carbonate of soda. Stimulants are not always necessary, but they may become so in an old and enfeebled subject.

Local treatment is of great importance. In such as will bear them, free incisions through the swollen and inflamed parts are beneficial. When inapplicable, I resort to nitrat. argent., applied freely over the whole discolored surface, which may then be fomented or poulticed. Dr. Physick blistered the parts; others put on alcohol, ammonia, turpentine—nay, the actual cautery. Pus, when formed, must be evacuated by incisions.

Erysipelas erraticum is a very common form of disease in overfed children and women of gross habits. A strip of skin some inches in length and of a finger's breadth, becomes red, with itching and burning, or the ear or the eyelid is thus thickened and inflamed. After an hour or two, the eruption disappears from that seat, and shows itself in another. Continuing to annoy the patient thus for a day and night with restlessness, some nausea, and slight fever, perhaps it goes away; or, in unfavorable cases, one of the attacks becomes fixed, and passes into erysipelas phlegmonodes.

Treatment.—Regulated diet, a saline purgative, a tepid bath. The lancet is sometimes used, but I have not found it necessary. It is usually a very slight malady, undeserving of the serious name given to it. Yet the inflammation resembles very much, for the brief period of its existence, that of true erysipelas; and when it fixes itself, and becomes "phlegmonoid," it must be managed with attention, as above directed.

DENGUE.

Scarlatina Rheumatica of Cocke and Copland; *Exanthesis Arthrosia* of Nicholson.

By the above title, of strange sound and still stranger derivation, we denote an arthritic fever, with cutaneous eruption, which appeared as an epidemic in some of our southern cities in the summer of 1828, having previously prevailed in the West Indies.

The first case in Charleston, occurred on the 10th of June; the second on the 20th. It spread during July with great rapidity, and ultimately attacked almost the entire population.

Dengue usually made its invasion with pain, stiffness, and swelling of some of the smaller joints, or of the muscles of a limb, stiffness of the neck, aching of the back and loins. These symptoms were soon followed by fever, with headache; suffusion of the eyes; full, quick, frequent pulse; hot, dry skin, restlessness, and thirst. The fever did not remit, but declined and disappeared generally on the second or third day. In this early stage the tongue was apt to be clean, and the stomach quiet; but sometimes there was nausea and even vomiting. The determination to the head was occasionally violent. There were instances in which delirium was among the first symptoms, coming on at the commencement, and enduring until the subsidence of the febrile paroxysm. At this time the skin lost its heat and dryness, becoming relaxed with abundant perspiration, and the local pains were all lessened in degree. A sort of miliary eruption or rash attended in some persons this sweating stage; and, in a few others, preceded both the local pains and the fever. It was, however, as connected with this first stage of dengue, a very inconstant affection. The muscular and arthritic pains did not go off entirely; a degree of swelling, stiffness, and tenderness remained throughout. During this sort of deceptive truce or interval between what may be called the first and second stadia of this strange disease, many believed themselves to have passed through the attack, and attempted to resume their ordinary occupations; but they soon discovered that their sufferings were by no means at an end. On the fourth, or perhaps the third day, there being little or no fever present, the tongue would be coated with a yellowish fur, and the stomach become distressed, uneasy, and irritable; the patient was dejected, fretful, and anxious. Vomiting came on in some, with great languor, lassitude, and debility, and nocturnal restlessness. This was regarded by numbers as the most oppressive and insufferable stage of the malady. On the fifth or sixth day from the invasion an eruption occurred in the large majority, attended with relief of all the annoying symptoms above enumerated. It varied a good deal; but may be described as consisting generally of minute papulæ, somewhat elevated, of a florid red, distributed in irregular patches; the feet and hands being somewhat swollen, with a sense of numbness. It appeared first on the face, then on the trunk and thighs, gradually spreading to the extremities. It resembled scarlatina more than measles in hue and aspect, but was less diffused than either. When fully developed, it was attended with some itching and burning, and, at this time, secondary febrile excitement came on, with return or aggravation of the muscular and arthritic pains. Inflammation and enlargement of the lymphatic glands in the neck, axilla, and groin, occurrèd in a good many cases, and continued for some time after convalescence was established. In a few instances suppuration of the tumors took place. The eruption disappeared usually after two or three days' duration, growing gradually paler, with desquamation of the cuticle. The affection of the joints was often tenaciously obstinate, persisting for weeks in some patients, and rendering them quite lame.

All persons equally and alike, the aged and the young, the infirm and the robust, the native and the stranger, the black and the white, were liable to it. Very young children, a few days or weeks old, were seized; nay, some were supposed to be born with it. Below the fifth year of age, the invasion was sometimes attended with convulsions, which might be repeated through the attack. In advanced life, there was debility, with great prostration; erysipelatous inflammation of the lower extremities supervened sometimes. The pains brought on premature labor in many pregnant women. The mouth was sometimes ulcerated, with glossitis and spontaneous salivation, lividness and sponginess of the gums. In a few cases hemorrhage occurred from the gums and fauces.

Again, in the summer of 1850, the city was visited by an epidemic, which I did not then, and do not now, hesitate to regard as identical with that which is briefly described above. Its invasion was abrupt, and its spread rapid; though probably, from its resemblance to scarlatina, which was then prevailing, the first cases were not recognized. The attacks varied in manner of invasion. It might come on with a stage of lassitude, and sensitiveness to temperature, but no chill; dull headache, with intolerance of light; anorexia generally, though some retained their desire for food; the tongue clean and red; some drowsiness; pain in the limbs and back. On the fifth, sixth, or even as late as the seventh day, the tongue would become furred, with gastric oppression and nausea, and an eruption show itself on the surface, with more or less itching, which, varying in distinctness from time to time, would gradually disappear, leaving the patient to convalesce. Generally, however, the attack was more sudden and violent; with severe headache, and universal distress, and great debility. The skin was hot and dry; the face flushed; the eye red and watery; the pulse tense, quick, and frequent. The pains in the back and limbs, and large joints, were intense; in some, the stomach and bowels suffered violent pain. The febrile paroxysm lasted from six to seventy-two hours, the average being, I think, about thirty-six. I heard of cases remittent and intermittent, but saw none such. In the fully formed attack there were often two very distinct stages, with an interval clear of fever. This interval, of two to four days, was sometimes so free from suffering, that patients would rise from bed, and lounge about the house, complaining only of debility; or, if resolute, even go back to their usual habits and occupations. But on the fourth or fifth, they would be forced to resume the recumbent posture, overcome with oppressive malaise and feebleness. A return of pain in the head and limbs, if it had disappeared, and often a recurrence of fever, would mark the access of this second stage. The tongue would put on a thick, yellowish fur, with more or less nausea, rarely to the extent of retching and vomiting; and on the fifth, sixth, or seventh day, some cutaneous eruption would exhibit itself, usually with a sense of heat and itching, from which time their convalescence would begin in earnest. It was always slow, with great muscular weakness. I have seen the pulse as low as forty in a minute; indeed, I met with cases, in which the heart labored throughout slowly and heavily, as we notice in typhus with softening.

The eruption was very various in appearance, and cannot be portrayed as characteristic. It resembled, in different examples, that of scarlatina, urticaria, measles, varicella, and others. Purpura was several times noticed amidst this confused variety of modes of efflorescence, and hemorrhage from various surfaces was reported. Abortion, or premature labor, was rare.

There was a marked difference in the proportion of cases presenting the eruption in the earlier and later attacks. It became universal, or nearly so, in those assailed in the last week of August and of September. There was also a marked difference as to its occurrence in the two races, who seemed equally liable to the disease, the blacks and whites. I paid much attention to the subject, and estimate the proportion of eruptive cases, as in white subjects, eight in ten; in blacks, less than half, probably two in five, or near it.

The latent period, or incubative stage, was totally undefinable. In Dr. Happoldt's well written essay on the subject, it is stated that "patients were received into the Marine Hospital who were attacked by the fever on the day of their arrival in the city." Dr. Bellinger was satisfied with the proof that two persons from healthy localities were attacked within twenty-four hours after visiting the city.

The disease was almost universal. Deaths were extremely rare. I saw none, and knew personally of none. I have heard and read of one from mere prostration; one or two of children with convulsions; two with erysipelas; two with tetanus, spontaneously supervening. Of *autopsies*, I have met with no record.

History, Pathology, and Diagnosis.—With neither inclination nor space for controversy on a topic still unsettled and disputed warmly, I shall briefly state the conclusions that I have arrived at, and leave the reader to form his own conclusions from a perusal of the monographs published at the different periods of the appearance of the disease, and entering fully, as I myself have done elsewhere, into minute detail.

I recognize Rush's "breakbone fever" of 1780, in Philadelphia, as the first notice of a malady such as I have called dengue, consisting essentially of an arthritic fever, with a cutaneous eruption or exanthem. I use the word *essentially*, as regards the masses, not the individual cases. If rheumatic fever, as maintained by such authorities as Fuller and Graves, may exist without the arthritis, and scarlet fever and measles may retain their identity, as is admitted by Sydenham and Gregory, though destitute of the catarrhal and anginose element, surely no objection founded on the irregularity of the eruption, will be valid against the view I present here.

Next we read of it in Calcutta, in 1824–25, very fairly described by Dr. Mellis. Dr. Waring, of Savannah, speaking of the epidemic of 1828, which prevailed also in that city as well as here, affirms that "dengue" was essentially the "breakbone" which we had experienced in 1826 and 1827. He uses the phrases, "eruptive breakbone," and "genuine eruptive breakbone," and "eruptive epidemic," to denote emphatically the *dengues*, for he maintains *their identity*, of 1826, 1827, and 1828.

In 1831, I observed and noted an eruptive or exanthematous complication with our autumnal remittents; but it was not very extensive or prominent. Dengue seems to have spread itself from New Orleans up the valley of the Mississippi, as we learn from Stone and others; it showed itself in Mobile in 1844, and in Natchez in 1848. From Professor Arnold, to whom I am indebted for a clear expression of the intelligent opinions of Dr. Waring, we learn of its existence in Savannah again in the fall of 1848, when he himself suffered an attack. In 1850 it prevailed, not only on our southern seacoast, but in some interior towns, Augusta among them; where it was encountered and very well portrayed as a "protean disease" by Dr. Campbell. In Charleston, the eruption was of so irregular occurrence that the epidemic was denied by some the name and character of dengue; they called it significantly, "breakbone fever." But in that very year, Professor Arnold found the eruption uniformly present, yet recognizes the disease as the same formerly known to him. Dr. Campbell has no difficulty in applying the same title to it. During the prevalence of yellow fever in Charleston, in 1854, many cases were designated as dengue, or rather as breakbone fever, by the attendants; some being eruptive and others not. Such indeed had been the fact in 1852, and many instances of eruptive fever were then met with.

I regard dengue, then, as an eruptive arthritic fever; exanthematous in a certain sense of the term, which is somewhat loosely and arbitrarily employed. Its history will be its best diagnostic in the mass; it will not always be possible to distinguish an individual case by any specific or characteristic marks.

It preceded yellow fever in Charleston in 1828, and followed scarlatina in 1850. Both these diseases give immunity from second attacks. Dengue respects the subjects of *neither*, assailing nearly the whole population on its two visits. Those only who *had* it in 1828 *escaped it* in 1850. This appeared to be the rule. If some few second attacks did occur, as is affirmed, it is easily explained. Diseases differ as to the degree of such immunity which they confer. Measles stands, I am persuaded, at the head of the list. Panum asserts, that in the Faroe Islands on the occasion of its irruption there in 1846, after an interval of more than sixty years, none of the old folks who had suffered from it so long before were then attacked. But Dr. Schleisner, in his *Medical Notes on Iceland*, tells us that "an interval of thirty-four years occurring between two visits of smallpox to that island, many old persons who had it before now took it again." We cannot wonder that an interval of twenty-two years should, in some, have renewed the susceptibility to dengue. It is on the belief that time will produce this effect, that revaccination is now everywhere practised.

Besides this, yellow fever and scarlatina are two of the gravest maladies on the catalogues of the nosologists, and produce, everywhere, a serious mortality when they prevail. But nobody dies of dengue or breakbone; no, not one in one thousand, taken promiscuously, and under all circumstances of discomfort or mal-treatment. As to its relations with malaria and malarious diseases, it suffices to remark that it is not produced, nor has it been known to spread, in the worst malarious localities.

The *cause* of dengue is unknown. It is epidemic and contagious. No one denies the first. The latter is much disputed, but I think the doctrine established. The rapidity of its spread has been made an objection; but it is of no weight until we know that we have apprehended the whole history of the invasion. In 1828, there were ten days, at least, between the arrival of the first patient ill, from Havana, and the sickness of the second case—next following; and, surely, from the last of May to the middle of July, there was time enough for extensive diffusion, so extensive as to seem almost an explosion. In 1850, there was a long series of "suspicious" cases talked of before the prevalence of the disease was an ascertained fact. As to the personal transmission, it is as well made out as it can be in examples of pertussis and mumps, and other maladies which generate no palpable matter. Until we can *inoculate*, we shall never be able to satisfy all the sceptical minds in our profession.

Of the Treatment.—The disease being, as I have described it, of so little mortal tendency, and self-limiting besides, it is not to be anticipated that I should advise or sanction any active interference with it. Yet the purely expectant treatment is not the best, either in its immediate or ultimate results. I do not know that we can shorten the duration of the attack; but I am sure that we have it in our power greatly to alleviate the sufferings of the patient at the time, to render his convalescence more prompt and complete, and to diminish his liability to many sequelæ which impend, and may, for a long time, persist to distress and annoy him. There is no febrile affection in which depletion is so generally unsuited or likely to inflict so much injury. It is possible that in a subject of ordinary vigor, a mild purgative or emetic may do no notable harm, but in the majority of cases they are uncalled for. The lancet is, I think, absolutely forbidden. I am speaking of simple uncomplicated cases. There are mixed examples in which, as in convulsions of children, transient evil is threatened, that must be turned aside by transient remedies; such as are rendered necessary by the immediate occasion, and which every practitioner is familiar with.

The combination of diaphoretic and anodyne seemed to me to fulfil universally the indications which were presented. In an ordinary attack, I prescribed the "alkaline mixture," so often referred to, consisting of carb. potass. ℈j, aqua ℥x, tinct. op. camph. ʒj or ʒij, of which the patient took a tablespoonful or two every second hour. If the arthritic pains were prominently severe, the dose of anodyne was increased proportionally. They were occasionally so intense as to wring tears and cries from resolute men and patient women. I have given, in such suffering, as much as a teaspoonful of laudanum, every hour and a half, or two hours, until relieved. The warm bath sometimes aided in giving this relief. I employed it, also, to shorten the interval between the first and second stage, and hasten the eruption.

Where headache was, as sometimes happened, the predominant ailment, I had the hair cut away; gave a prompt and active enema as derivative, and with the same view, kept the feet in hot water, or covered with mustard poultices, while cold cloths and ice were assiduously applied to the head.

The miserable and dejected convalescence was hurried forward by the prudent use of stimulants; aided sometimes by cinchona in strong infusion, which I preferred to the quinia, so very widely administered by my brethren generally.

Treated in this manner, patients very generally began to convalesce decidedly on the 7th or 8th day, and were able to return to business on the 14th, or shortly after, free from the decrepitude, infirmity, and furunculoid annoyance so much complained of.

DISEASES OF THE URINARY ORGANS.

The *kidneys* are the only viscera whose function is exclusively excretory, and this depurative office is of such importance that it can never be impeded or imperfectly performed, without serious risk, and grave disorder of the system. The urine contains numerous elements, each of which must be thrown off from the blood, as injurious when retained. A knowledge of its normal composition, and its ordinary vitiations is absolutely necessary to the physiologist and pathologist.

The nitrogen of the ingesta—effete—finds its way out hence in urea, and uric acid; as the carbon does by the lungs and skin, and carbon and hydrogen by the liver. Of urea there are not less probably than four hundred and seventy grains excreted in health, on an average, in twenty-four hours.

Every practitioner should be provided with the means of examination of the urine. It is probably altered in every form of acute disease—perhaps in all chronic affections, also; and we shall not know, but by accumulated observations, how many, and which of those alterations are significant, and in what manner.

An achromatic microscope, to detect the visible matters diffused through it; an urinometer, graduated to exhibit its specific gravity; a spirit lamp, with test tubes and litmus paper, should be in the possession of every one. A certain amount of chemical knowledge is, also, indispensable to the scientific and qualified physician.

It is in a great number of instances exceedingly difficult, if not in the present state of our knowledge impossible, to decide the question whether the morbid qualities of the urine, so generally observed in disease, are to be regarded as cause or effect, or mere coincidence. The close connection between renal and nervous disorder has been long known, but was strikingly brought to view in the experiment of Bernard, proving that injury of a certain portion of the brain was always followed by the presence of sugar in the urine. Hence, as formerly diabetes was imagined to consist in local disease of the kidney, and afterwards transferred by the researches of Macgregor and others to the digestive organs as its source, so we are now disposed to attribute it to some irritation increasing the production of sugar in the liver on the one hand, or on the other, to lesion of the pneumogastric nerve at its source, impairing the consumption, oxydation or combustion of that product normally going on in the lung.

We have had perpetual occasion to refer to these long observed associations. In hydrops, in scarlatina, in gout, they have always been deemed of important interest, yet we remain without clear ideas of the nature of the relations.

The color, appearance, and actual composition of the renal excretion, as well as its quantity, are very different under varying contingencies of transient character, and allow of a very wide range, in consistency with the enjoyment of health.

Yet beyond a certain limit, not readily definable, these changes must influence the condition of the organism greatly. Blood, poisoned by the non-elimination of those effete matters, which find their way through this important outlet, must be in the most impressive degree unfit for the uses of the economy, and liable to prove deeply injurious to the tissues through which it circulates.

It is worthy of notice that the presence in the urine of three of the principal elements of nutrition constitutes the chief portion of the history of some of the worst maladies which affect the human frame. Thus the escape or exosmose of *albumen*, going on for any length of time, is indicative of, or occasions extreme impoverishment of the blood; while it is injuriously associated with a loss of the specific gravity of the excreted fluid, showing a non-elimination of the solid matters that ought to be thrown off by this outlet. The similar loss of *sugar* is always coincident with a rapid waste of the tissues from defect of supply on the one hand, and on the other from a rapid metamorphosis or disintegration, shown by the high specific gravity of the enormous amount of fluids passing off. *Oil* globules, and fatty matter mingled with epithelial debris and other exudations, tend also to prove a declining state of the system.

The absence of urea is of almost equal importance, and uræmia, or poisoning of the blood by its retention, is universally recognized as a dangerous contingency. It is uncertain whether it is injurious by its own special qualities, or, as some chemists affirm, by its conversion into carbonate of ammonia. As an effete product, it may do harm in both conditions.

Urines are *morbid in quality* by change of proportion and defect of normal elements; and by addition of some new principle. In gout and rheumatism, we have undue amount of uric acid, and the urates; in diabetes, the presence of a new body, sugar; in oxyluria, oxalate of lime, and sometimes blood-corpuscles; and epithelial cells and plasma and blood itself, and albumen and fatty globules in Bright's disease, or albuminuria. In pneumonia the chlorides disappear: urea in many diseases.

Craigie teaches correctly that the majority of these changes and vitiations result, not from primary disease in the kidneys, but in the organs of digestion and assimilation. Yet though this is ordinarily their history, I am ready to admit with Holland, that the kidneys, though more rarely, may be the original seat of the difficulty, by the impairment of their function. Hence result the several *concretions* known as gravel, renal, and urinary calculi, and stone in the bladder; which consist of phosphates, lithates, and oxalates of lime, soda, ammonia. The presence of these is known by deposits from the fluid when cold; by chemical analysis; by the use of the microscope; by the irritation they give rise to in passing, when small enough to pass through the ureter and urethra, and their being found after passing; and by certain symptoms which they occasion in the urinary organs, while present in the kidney, the ureter, the bladder, and the urethra.

Uric acid appears often in the form of "red sand," as it is called; it is met with most commonly in gouty subjects, but may result from various forms of disorder of the digestive organs. It requires the persistent use of alkalies; of which the best is doubtless the carbonate of potassa. This must be taken in as large quantities as may be necessary to keep the urine slightly alkaline, and, unless largely diluted, will not be well borne.

The phosphatic deposits are, perhaps, almost as frequent as the lithic. They belong to the condition of broken-down invalid constitutions; follow injuries of the spine, etc. Many of the calculi taken from the bladder by the surgeon consist of the earthy phosphates.

This diathesis is not to be got rid of but by a general improvement of the system. The indirect methods of restoring the patient to health must be dictated by a careful examination into his condition. Among the best tonics and restoratives are change of air—a sea-voyage—visits repeated annually to some pleasant watering-place—and a careful attention to diet and habits of life.

Oxalate of lime is difficult to detect by any reagent. It is an almost insoluble salt, yielding reluctantly to any menstruum. Its peculiarly shaped crystals and dumb-bell groups must be looked for under a good microscope. Its presence is usually associated with many oppressive but not easily defined symptoms of general or constitutional disorder, which Houston collated together and designated by a particular name, *oxyluria*, as indicating a specific form of disease; but this view is not generally concurred in.

It may be well to insert here a brief notice of the tests usually employed in the examination of urines supposed to be morbid.

For *albumen;* the application of heat and of nitric acid will coagulate it.

For *sugar; Moore's test* consists in boiling the fluid in a test-tube for a few minutes with half the quantity of liquor potassæ; if sugar be present, the whole will assume a brown hue. *Trommer's test* consists in mixing with the urine a few drops—a small amount proportionally—of a solution of sulphate of copper, so as to give a pale blue color. Half the quantity or volume of liquor potassæ is then added, and the mixture must be boiled. If sugar be present, a reddish or yellowish-brown precipitate of sub-oxide of copper is thrown down. If no sugar be present, the precipitate is black oxide of copper. The *fermentation test* discloses very small quantities of sugar, and is resorted to in doubtful cases. Fill a test-tube with the urine mixed with a little yeast, invert it and place it in a saucer containing a little more of the urine: set it in a warm place, giving it for 24 hours a temperature of 70° to 80° Fahr. Carbonic acid will be found by fermentation, if sugar be present, occupying the top of the tube.

For *urea;* add nitric acid to urine in a flat vessel, such as a watch-glass, evaporate by boiling, or slowly; crystals of nitrate of urea will be obtained.

For *the chlorides* of sodium and potassium; dilute a portion of urine with equal volume of distilled water; add a drop of nitric acid, to neutralize any ammonia that may be present; then add a drop or two of the solution of nitrate of silver, which will precipitate a dense cloud, if they be present in the usual amount.

The absence of either of these last elements indicates danger. Uræmia is always injurious. "And in 80 cases of pneumonia, observed by Redtenbacker, the urine did not become turbid with nitrate of silver; but as the inflammatory action subsided the chlorides reappeared."

Let me repeat that we must not be hasty in drawing conclusions from temporary vitiations of the urine. Sugar may be occasionally present, as in the urine of the aged, as it exists in the blood, and in many of the tissues, and has been found in albumen, pus, and tubercle. Albuminuria, noticed in a great variety of diseases, has been in each exaggerated into undue importance as a symptom. Glucosuria is shown by the *persistent abundance* of sugar: Bright's disease of albumen.

The kidney is liable to *inflammation*, *acute* and *chronic*.

ACUTE NEPHRITIS, like other phlegmasiæ, comes on with chill succeeded by fever, severe pains are felt in the loins, aggravated by motion, and extending down generally on one side, to the bladder, and even the testicle, which is drawn up, with aching in the hip and thigh of that side. There is distressing nausea, and great thirst. The urine is scanty, high-colored, and albuminous; perhaps bloody and purulent.

The *causes* of acute nephritis are external violence, great fatigue, harsh rough exercise, as on horseback; certain irritants produce it, as turpentine, cantharides, and sometimes cubebs and copaiba. It is ascribed to metastasis of the exanthemata, and of gout, and of rheumatism. It cannot fail to follow, soon or late, the presence of a stone too large to pass into and through the ureter to the bladder.

The *diagnosis* is not difficult. We separate it from nephralgia, which it often simulates, by the presence of fever from the commencement. This does not belong to the history of the latter, though it *may* arise in its course. The composition of the urine, too, is characteristic.

Prognosis.—If of one kidney, accidental, and from transient cause, it is attended with little risk, in a good constitution. If both kidneys should be at once affected, there would be danger in the impediment to the excretion of urine, which always oppresses the sensorial system, soon giving rise to fatal coma. The presence of a concretion must ultimately destroy the organ, when too large to admit of farther distension of the pelvis and ducts.

Autopsy shows the kidney in various states, according to the period at which death occurs, congested, inflamed, disorganized by abscess. The brain is deeply injected with dark blood, which contains the uneliminated urea.

The *treatment* of acute nephritis is, of necessity, antiphlogistic, by venesection, purgatives, oily and resinous, with large emollient enemata; cups over the loins, and warm fomentations to that region, and over the pubes; and when the bowels have been well moved, free doses of opium, with antimonials, to relieve pain and determine to the surface. Mercurials are advised by some practitioners.

Chronic nephritis presents similar symptoms with less intensity. At first a feeling of fatigue, readily brought on, with aching in the loin, and in the side, and groin, and testicle; urine high-colored, scanty, albuminous, turbid. Exercise increases the symptoms; the patient emaciates with dejection of spirits. There is usually a febrile paroxysm, in the evening, with restlessness.

Cause, *diagnosis*, *prognosis*, *autopsy*—all such as are described under the head of acute nephritis.

The *treatment* consists in local depletion, keeping the bowels soluble, and the employment of the less irritating diuretics, such as buchu, digitalis, colchicum. Some prefer the alkaline and neutral salts, the carbonates of soda and potassa, and the acetate of potassa. There is relief often obtained at the watering-places, rather, I think, by the amount of fluid drank than its quality.

BRIGHT'S DISEASE.—*Desquamative Nephritis.*—The late Dr. Bright, of London, was the first to bring to the notice of the profession the connection of a well-marked structural alteration of the kidneys with persistent albuminuria. No pathological subject has been more closely investigated in the period that has since elapsed, yet there is still much confusion in the views entertained concerning it, and not a little uncertainty. Many varieties of renal degeneracy are described under the name of morbus Brightii; and it is not yet settled whether these are essentially different conditions, or merely stages of one form of progressive alteration. Prof. Gross, our highest American authority, treats of it simply as "granular degeneration; the result usually of chronic inflammation; leading, as its main symptoms, to albumen and fibrinous casts in the urine, and to dropsical effusions." He considers all the affections included under the above title by different pathologists to be "so many stages of a single progress." Bright himself describes three forms. Christison distinguishes three stages; Becquerel treats of four varieties; Johnson recognizes, microscopically, five forms; Martin Solon divides it into five varieties; Rayer, calling it simply nephrite albumineuse, into six; Rokitansky into eight. Even the primary symptom which led to the detection of renal disorganization has been proved not to be uniformly present. Dr. Storer, of Boston, and Dr. Donaldson, of Baltimore, have each recorded a case of well-marked character without albuminuria.

It usually shows itself as a chronic affection, coming on insidiously, and gradually undermining the constitution with a long train of ill-defined ailments, including, in their progress, most of the organs and their functions. The complexion is sallow and anemious; the muscular system flabby and feeble with emaciation; the digestion is impaired, with torpor sometimes of bowels, but often an irritating diarrhœa; there is œdema of the lower extremities, and dropsy soon supervenes, anasarca and ascites; cough sometimes attends; mental imbecility or languor, and in some cases coma, gradually come on; and the patient sinks into death. There happen now and then instances in which the same or similar symptoms are hurried on with acute promptness.

The characteristic phenomena which may indeed be regarded as recognized diagnostics in the case before us, are—persistent albuminuria and the presence of what are called *tube casts* in the urine. As to the first, I have already mentioned the occasional occurrence of exceptions; but they are rare. Desquamative nephritis or renal degeneration is however proved, if it be not indeed constituted by the throwing off of casts of the uriniferous tubes, containing oily granules and epithelial cells. These are readily discovered under the microscope, and are described and pictured by Bennett as of "four distinct kinds: 1st. Fibrinous or exudative; 2. Desquamative; 3. Fatty; and 4. Waxy casts.

For the albumen in the urine, both tests of heat and nitric acid should be always employed. To see the tube-casts, Bennett directs us "to allow the urine to repose for 12 hours, then pour off the supernatant fluid and put the sediment into a test-tube. Allow this to rest for another 12 hours, and bring the concentrated precipitate at the bottom into the field of the microscope."

"The most prominent symptom of the disease," says Frick, "is anæmia; the mode of death in about one-third is by coma. This has been generally ascribed to poisoning by retention of urea; Frerichs contends that it is not properly uræmic, but is owing to the carbonate of ammonia formed by the decomposition of urea."

Autopsy discloses so many varied conditions of the organ affected that a minute description of each variation would occupy a volume. A few paragraphs must suffice. 1. In "acute desquamative nephritis," such as occurs after scarlet fever, "the whole gland," says Prof. Gross, "is hypertrophied, flabby, and very vascular; the uriniferous tubes are filled with fibrinous deposits, but the renal epithelium is unchanged, although cast off from the sides of the tubes. The urine is dark and of high specific gravity, and contains blood-corpuscles, fibrinous casts, and epithelium."

2. The kidney is found large, but pale—"the white kidney" of Barlow. "When the tunic is peeled off, which it may readily be, the surface is presented very pale and of polished smoothness. Microscopic examination shows the obliteration of the tubuli by inflammatory deposit. The urine shows a large quantity of blood-matter, and deficiency in the proper excreta."

3. The kidney is large and "mottled" with white upon a dark ground; the urine very similar to that described above; and of diminished specific gravity.

4. This is known as the "hard, granular, contracted kidney;" it is smaller than in health; its surface is puckered and uneven and its tunic adherent. The secreting structure is atrophied, with no deposit in the tubes. "The degeneracy," says the author last quoted, "consists of a large increase of fibrous tissue, which by its contraction strangulates and atrophies the secreting cells, much as in hepatic cirrhosis. The urine may not be at all albuminous, or very little so; it is of very light specific gravity, the excretion of the solid ingredients of the urine being suppressed." In each of the above forms it has been known to be as low as 1000 or 1002.

5. The fatty kidney—dwelt on by Johnson—pronounced by Gross to be "rare in the human subject, and compatible with perfect health, in many cases. It is of a pale yellowish complexion, and a soft fatty feel." Barlow also regards it as of little importance; and speaks of it as "rather an effect, and a sign of previous disease" than a cause of any disease.

The *prognosis* in all these renal affections is very grave; the majority of the cases terminate fatally, some in one mode, some in another. In a considerable number as has already been stated, the symptoms of uræmic poisoning, debility, languor, coma, stupor, manifest themselves; others are attacked with pneumonia; others sink under diarrhœa, or yield to atrophy from innutrition.

Their *causes* are not clearly known. They follow scarlatina and smallpox, and are ascribed to intemperance and abuse of medicines, especially mercury. Christison and others look upon them as of scrofulous character; from which opinion Watson dissents. Walshe attributes them to a primary vice of the blood.

The *treatment* is uncertain and far from generally successful. Bennett urges the use of diuretics, and speaks confidently of cures produced by them; in this respect being sustained by the weighty authority of Christison.

The acuter forms should be combated by cupping over the loins, and warm fomentations, at first with warm baths and Dover's powder as diaphoretic. Afterwards diuretics should be perseveringly resorted to. The most valuable, Bennett tells us, is "the bitartrate of potass; digitaline in minute doses, and the external application of spongio-piline saturated with a strong infusion of digitalis are useful." Addison says, "The very great usefulness of the liquor ammoniæ acetatis in these cases deserves to be generally known." He has found it, by acting on the skin and relieving the congested condition of the kidney, the best of all his remedies. He advises diuretics at the same time to be avoided. Others, however, with Bennett and Christison, depend chiefly upon them in combination with mercurials. The acetate of potass is given, buchu and colchicum. Opium is freely administered, pro re nata.

Tonics are often demanded; of which class iron, zinc, gentian, and cinchona have been preferred. If possible the patient should seek a warm climate. On the whole, if we can procure an arrest of the urgent symptoms, farther benefit is more fairly to be expected from the means of constitutional improvement of the general health, than from any remedies yet known or supposed to be applicable to the special condition of the organs affected.

NEPHRALGIA.—This is one of the most painful of human maladies. It consists of two elements; neuralgia of the kidney, combined with the worst annoyances included in the history of dyspepsia. There is no fever, nor any token of local inflammation. The pulse is slow and soft, generally; the muscular strength is impaired; there is severe aching in the loins, hip, back, and thighs. Paroxysms of intense suffering assail, from time to time, with an ill-defined periodicity, in which the groin and testicle are affected, the latter being vehemently retracted.

Flatulence attends or follows a paroxysm, constituting what has been called "nephritic colic." The urine is amber-colored, may show neither deposit nor morbid contents, on chemical analysis, but the microscope will often detect crystals of oxalate of lime diffused throughout, acicular, cubic, or dumb-bell, or kidney-shaped. The frequency of this morbid element has been recently discovered to be very considerable. It is ascribed to a special vice of assimilation.

The *treatment* of a paroxysm of nephralgia requires the free use of opium, or of morphine and its salts, made much more available by concentration, and disturbing the stomach less. The hot bath is serviceable. Warm fomentations to the loins and lower part of the abdomen must be assiduously employed. "*Tics*," or flashes of pain running through the bladder, and to the end of the penis, sometimes warn us of the passage of a calculus through the ureter, which, when accomplished, gives immediate and entire relief, for the time. Its exit from the bladder must be aided, as far as possible, by procuring a large flow of urine, by diuretics, and retaining the discharge until a full stream is ready to be projected forcibly. The transition from nephralgia to nephritis, which sometimes occurs, must be watched. If the skin becomes hot and dry, with or without a chill, and the pulse hard and frequent, venesection, local and general, will be necessary. A purgative will often relieve the severity of pain, even purely neuralgic. I do not hesitate to employ, for the same purpose, as an anæsthetic, chloroform, in proper amount, and as often as required.

To correct the nephralgic diathesis, we must pay strict attention to the diet; not more than a moderate portion of nitrogenous food should be allowed, though the subject, as a dyspeptic, would suffer too much from confinement to vegetable aliment exclusively. Certain articles, containing oxalic acid, and waters impregnated with lime are especially to be shunned. Wines and malt liquors are to be avoided. The bowels should be kept regular, and muscular fatigue, and mental anxiety evaded as much as possible. The nitro-muriatic acid has been highly eulogized; I have seen it often fail. Colchicum and magnesia are, for short periods, beneficial, but soon become useless or irritative. The mineral waters—those, especially, which contain carbonic acid, do service; but must not, if they prove purgative, be pressed too far. Local counter-irritation is of benefit. Granville's liniment, or tinct. aconit. may be chosen.

We may admit, in general terms, that the treatment of those renal disorders, involving the presence of morbid urine, with or without deposit or concretion, has not been, as yet, much advanced by the application of our chemical knowledge. We know no certain means of correcting the tendency to form such concretions within the kidneys, or to dissolve them when formed. We still hope for the discovery of such means, and must seek for them perseveringly. The indications we should follow are, to determine to the skin, whose function is adjuvant to, or contrasted with that of the kidneys, by warm clothing, frequent bathing, friction, &c., and diaphoretics; to improve the condition of the digestive functions, by careful attention to diet, and by the use of such tonics as act favorably upon the stomach, among which iron is generally preferred; to correct any special tendency or diathesis discovered to exist, by those chemical reagents which promise most; such as the use of alkalies in the uric acid diathesis, and nitro-muriatic acid in oxyluria; to relieve undue determination to or congestion in the kidneys, by local depletion, counter-irritation, and the employment of the mild aqueous diuretics, and those which have been found specially adapted, as colchicum, uva ursi, buchu; and lastly, by careful observance of all such rules of regimen as may be required in every special case,to bring up the system of the patient to its best condition of general tone and health; as by travelling, voyaging, visits to the watering places, interruption of occupations, and repose of body and mind.

ANURIA—*paruria inops*—is not unfrequently met with as a symptom in certain diseases, as in cholera asphyxia and yellow fever. This non-excretion—non-elimination of urine must not be confounded with its *retention* in the bladder. However occasioned, it produces great disorder of the system, and especially of the brain, with stupor and coma, from the poisonous effects of the constituents of urine retained in the circulating fluids. In less degree it is associated with dropsies, more probably as coincident effect of some common cause of both. I doubt its idiopathic existence in any instance.

DIABETES—*glucosuria*—Inordinate discharge of urine. The quantity of this excretion is varying continually, with the difference of temperature, time of day, moisture of air, food, drinks, states of body, and emotions of mind.

Some headaches are regularly attended with large limpid flow of urine; hysteria and certain other nervous affections, strikingly exhibit the same symptom.

I once saw a case in which about twenty-four pounds were discharged in eighteen hours. The patient was a mulatto woman, between sixty and seventy years old, who seemed much debilitated by it. It was connected with no obvious cause, ceased suddenly, and she recovered promptly and entirely.

The books speak of a diabetes insipidus; I doubt its existence, and have never met with it, unless the above may be so regarded. Diabetes mellitus is characterized by a peculiar vitiation of the inordinate amount of urine, which contains *sugar*, and presents little or no trace of urea. The fluid is sometimes frothy, giving out a faint subacid smell, and attracting flies and other insects. It ferments readily; yields sugar by evaporation; is of high specific gravity, often from 1030 to 1036; deficient in urea and lithic acid. Many pounds of such urine are discharged daily, for weeks together; the strength of the patient decreases rapidly, and emaciation ensues; the duration of diabetes varies much, however; it is often connected with bulimia and polydipsia; the digestion being very good and the appetite insatiable, and, of course, prolonging life. There is even in some, a stage in the progress of the disease in which fat is deposited, disappearing as the case grows worse, supervening again if it is arrested, as the first stage of recovery. It may last for months and years. I saw a fine young man die of it in less than a fortnight. The degree of profluvium has an influence on its duration, doubtless; and this varies from eighteen pounds to forty-two per diem. In advanced stages, there is a constant sense of weariness in the loins; irritative fever is present, highest in the evening; the mouth and general surface are very dry.

The *cause* is not well known. It is ascribed by some to intemperance; but I have met with it in three persons remarkable for abstinent habits. The promptly fatal case above mentioned, was in a gentleman who had never during his twenty-five years of life *tasted* either wine or ardent spirits. He attributed his attack to the fatigue of constant standing at his desk. It is said to occur in connection with hepatic disease.

Pathology.—Diabetes mellitus consists in some obscure vice of digestion and assimilation. The development of sugar takes place in the stomach itself; it has been found there, and in the intestines, and upon the feces. Bernard has proved that sugar is always formed in the liver, and that when certain parts of the brain are injured it shows itself in the urine. We hence infer that pathological conditions of the sensorial system may give rise to diabetes. The sugar passing into the blood from its hepatic source, in health undergoes conversion in the lungs; thus it would appear that derangement of the respiratory function may induce it. Sugar appears in the urine in many unallied forms of disease, and also in old age. It abounds sometimes in the urine, so as to be strongly perceptible to the taste, and to attract flies. The fluid contains also frequently the torula cerevisiæ, or yeast plant, and ferments rapidly. A portion of the uneliminated urea is found in the blood.

Watt regards diabetes as a special cachexy, like gout and scurvy. Some maintain its dependence upon a primary morbid condition of the great sympathetic nerve.

Autopsy shows little or nothing to account for the symptoms. The body is much emaciated. The kidneys are sometimes fatty.

Prognosis generally unfavorable, though some patients recover. There always remains a strong tendency to relapse. The danger is correspondent to the amount of fluid discharged, and the proportion contained in it of *sugar;* this Todd looks upon as the diuretic which urges the kidneys to morbid activity.

Treatment.—On chemical principles, vegetable diet has been absolutely prohibited, and the patient kept exclusively upon animal food, as highly azotized. All fermented drinks are ordered to be abstained from. Bouchardat affirms that "if all amylaceous matter be taken from the food, sugar will disappear from the urine;" but Todd denies the fact. There is no doubt, however, that this course of management is productive of very useful results.

In direct opposition to these views, it has recently been suggested that sugar is an essential element of nutrition and assimilation, and that its rapid loss must be supplied by an abundant administration of it with the food. Sufficient trial of this plan has not yet been made to enable us to pronounce upon its probable efficacy remedially.

Opium and the mineral acids have been, of all medicines, most confided in, and are very freely used. Combined with them, some prescribe iron, lead, zinc, as tonics and astringents; and others cinchona, kino, and catechu. The bowels are to be kept soluble during this course of treatment, by the resinous purgatives—aloes, rhubarb, etc. Venesection has been employed in some robust subjects; it is said with benefit. More frequent advantage is alleged to have been derived from topical depletion, by leeching and cupping the loins, and from counter-irritants, applied to the same region. Emetics, frequently repeated and long persisted in, are affirmed to have been decidedly serviceable. Rennet and yeast have been proposed, on plausible chemical considerations, as remedies here; and favorable reports made as to their beneficial effect by Drs. Gray and Nelson, and Prof. Wood.

For my own part, I have found few maladies so intractable. I have derived some advantage in retarding its progress, certainly, though seldom removing it entirely, from confinement to animal diet almost exclusively, with the free use of opium and mur. tinct. ferri.

CYSTITIS—*Inflammation of the Bladder*—may be acute or chronic. The former is rare, except as supervening on the latter, a fatal instance of which once occurred under my care.

Symptoms.—It is readily known by the locality of the suffering, the incessant micturition and dysuria; febrile irritation runs high with restlessness and delirium.

The *chronic* form is not unfrequent in advanced life, when we have similar symptoms in less urgent degree. The urine is full of thick mucus; is sometimes loaded with phosphates, sometimes alkaline; the frequent calls to pass water wear out the contractile powers of the sphincter, and the fluid dribbles away constantly with scalding, and offensive smell.

The *cause* of cystitis is sometimes difficult to detect. It follows upon excess, debauchery, and intemperance. It may arise from morbid conditions of the urine when containing irritating matters, solid and fluid; or it may be the result of a gonorrhœal affection, extending upwards along the urethra into the bladder; or of gleet with stricture; or of the remedies employed for the cure of these affections.

Autopsy shows thickening of the bladder, sometimes to a very great extent, and even ulceration.

Treatment.—In proportion to the acuteness of the attack, and the youth and vigor of the patient, the antiphlogistic regimen should be instituted, and carried out with energy.

Venesection will sometimes be required to be repeated; and we may generally leech the pubes or perineum with much advantage. Warm fomentations should be assiduously applied. The bowels must be freely moved with oily or resinous purgatives, aided by large tepid enemata.

Opiates must be administered to relieve the severe suffering of the patient; they may be combined usefully with relaxants and diaphoretics, as ipecacuanha and camphor. Some advise alkalies and diuretics. I have, however, found them irritating and injurious, with the exception of magnesia and digitalis, which may occasionally be properly prescribed. Subacid mucilaginous drinks may generally be allowed.

These last mentioned remedies are better adapted in *chronic cystitis*, which is also benefited by the use of the thermal springs and sulphur waters. The repeated use of soothing mucilaginous enemata with opiates in proper amount may be considered as among our very best means of relief in these annoying and obstinate cases. The warm bath is also an excellent palliative.

CYSTERETHISMUS—*cystorrhœa*—"*irritable bladder*"—demands similar *treatment* with the affection just spoken of. Indeed it is hardly to be distinguished from it. We may remark the absence of febrile excitement, far less emaciation, and general disturbance of the constitution, as *diagnostic*. We may venture upon a less timid employment of diuretics here. Vegetable articles of this class deserve a preference. Infusions of these, and a solution of tannin, are injected into the bladder with good effect. Common green tea is also employed in the same way. I would expect advantage from small quantities of opium dissolved in it, and from time to time thrown in gently.

ADDISON'S DISEASE.—*Bronzed Skin.*—Disease of supra renal capsules. In the year 1854 the distinguished physician, whose name is inseparably connected with the topic now to be briefly discussed, announced the discovery of a constant relation between certain symptoms of anemious disorder, with morbid change in the ductless glands above named. He had long known the series of symptoms, and had designated them "idiopathic anæmia," as occurring without assignable cause; being preceded by "no loss of blood, no diarrhœa, chlorosis, purpura; no renal, splenic, miasmatic, glandular, strumous, or malignant disease." I cannot do better than to quote his graphic description of the affection, which is of very serious character, and, indeed, usually of fatal malignity. It occurs in both sexes; generally beyond the middle age, and in constitutions predisposed to become fat; approaches slowly and insidiously, so that no date can be fixed for the commencement of the languor, shortly to become extreme. The face is pale, the eyes of pearly white; the frame flabby; the pulse full, but very soft and compressible; jerking under slight excitement; with growing indisposition to exertion, there is faintness and breathlessness in attempting it, the heart readily palpitates, the surface presents a blanched, smooth, waxy appearance; the lips and gums seem bloodless; the appetite fails, the stomach is irritable; œdema of lower extremities shows itself; with the extreme bodily debility, the mind fails, with wandering and a torpid insensibility. The patient dies, retaining after months of such illness and decay, a remarkable bulkiness of frame and seeming obesity. With these phenomena is combined throughout, the characteristic discoloration—the *bronzing of the skin*—which gives a second title to the disease. The color is dingy, or smoky, or amber, or chestnut-brown; occurs in patches, mottled or checkered; is strongest on the face, neck, superior extremities, penis, scrotum, in the axillæ, and round the navel. It is occasionally manifest, too, in the form of small black spots beneath the peritoneum of the mesentery and omentum. Dr. Addison has recorded several cases in which the symptoms above described having been present during the life of the patient, on examination of the bodies after death, the capsules were found to be greatly altered by inflammation and its results, or by strumous or malignant deposit. Since the publication of his paper, a considerable number of similar examples have occurred to different practitioners, and have been duly reported. The coincidence of the contingencies thus brought together by him for the first time to the notice of the profession, must be regarded as an established general fact.

In the farther discussion of the subject, however, physiologically and pathologically, difficulties not yet surmounted present themselves. Disease of the capsules is proved to have occurred without bronzing, and bronzing without capsular disease. The suggested function of these bodies—an action upon, perhaps a removal of pigmentary matter—is not clearly made out by physiological experiments; nor although the ingenuity of Brown-Séquard, and his antagonists, Philippeaux and Harley, have been earnestly exerted, has it been decided whether they are or are not essential either to life or any modification of color. A piece of bronzed skin under the microscope, examined by Harley and by Dalton, presented to each the same appearances. The pigmentary matter was deposited in a granular form in the epithelium cells of the rete mucosum. Dalton says that it could not be distinguished from the pigment of a mulatto. Harley "has examined bronzed skin taken from a patient with healthy supra-renal capsules, and convinced himself that its microscopical structure was in every respect identical with that taken from the other patient with diseased capsules."

I treat of this subject here, because of the anatomical connection of these bodies, their *local association* I should perhaps say, with the kidneys. Their function is as yet unknown, and absolutely conjectural; it is not supposed to be an integral element in the important excretion, or eliminatory office of the organs, to which they lie so near.

On the whole, I conclude that there is always good reason to infer from the anæmia, bronzed skin and other associated phenomena, the existence of disease of the supra-renal capsules, or one of them; yet that the coincidence not being proved to be uniform, they do not stand to each other in the relation either of cause or effect; but arise as the results of the action of a common cause, hitherto undetected, which may produce either alone.

The treatment is altogether unsatisfactory and unsuccessful. In the early stages, I would hope something from residence in the country, exercise in the fresh air out of doors, and the cold bath with frictions to the skin; nutritious food, rather albuminous than oily, and an avoidance of starchy, saccharine articles, and above all, fermented drinks. The alkalies might be serviceable, with the preparations of iron and cinchona. Mercury has been proposed, and the combinations of iodine; but I see no reason to expect any benefit from them.

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